Environmental Assessment

Remediating Native Fish Spawning Habitat in the St. Clair – Detroit River System

Detroit River and St. Clair River, Michigan

June 2014

Prepared by:
United States Geological Survey
Great Lakes Science Center
1451 Green Road
Ann Arbor, MI 48105

In Cooperation with
University of Michigan
Michigan Sea Grant
SmithGroupJJR

July 10-14
Date Approved

Leon Carl
for U.S. Geologic Survey
Leon Carl, Midwest Regional Director

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PREFACE

The National Environmental Policy Act (NEPA) of 1969 requires that federal government agencies identify and consider the social, economic, and natural environmental impacts of proposed actions as part of their decision-making processes. NEPA also requires that agencies receiving federal aid for a project provide information to the public and consider their input when reaching decisions. This Environmental Assessment (EA) has been prepared to satisfy these requirements.

Proposed federal actions are classified into three different categories under NEPA. Class I actions "significantly" affect the environment and require preparation of an Environmental Impact Statement (EIS). Class II actions, deemed "categorical exclusions" do not have a significant effect on the environment, and do not require an EA or an EIS. Class III actions are those for which the significance of impacts is not clear. These actions require preparation of an EA to determine if an EIS or Finding of No Significant Impact (FONSI) is the appropriate type of documentation.

This EA has been prepared for the Remediation of Native Fish Spawning Habitat in the Detroit – St. Clair River System, Michigan. It includes several sections that address the following topics:

- The purpose and need for the project.
- Alternatives that were considered when designing and locating the proposed actions.
- Existing environmental conditions in the project area.
- Likely impacts and benefits of the proposed actions.
- Consultation and coordination that has taken place with the public and government agencies.

The worked described in this EA is part of a larger overall effort to remediate the St. Clair and Detroit rivers. Both rivers were identified as Areas of Concern (AOCs) under the U.S.-Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol and the 2012 Amendment) because they experienced severe environmental degradation resulting in a number of formally designated Beneficial Use Impairments (BUIs). The proposed habitat remediation work is an important part of the restoration and delisting process for two Beneficial Use Impairments: 1) Loss of fish and wildlife habitat (BUI 14); and 2) Degradation of fish and wildlife populations (BUI 3). For this reason, the project team has already received funding for the St. Clair River projects from the U.S. Environmental Protection Agency through the Federal Great Lakes Restoration Initiative.

REMEDIATING NATIVE FISH SPAWNING HABITAT
IN THE ST. CLAIR – DETROIT RIVER SYSTEM
ENVIRONMENTAL ASSESSMENT

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APPENDIX E. Documentation Relevant to Public Involvement

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ACRONYMS AND ABBREVIATIONS

AOCs	Areas of Concern
BPAC	Binational Public Advisory Council
BUI	Beneficial Use Impairments
CFR	Code of Federal Regulations
DTE	Detroit Edison
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GIS	Geographic Information System
GLFC	Great Lakes Fishery Commission
GLNPO	Great Lakes National Program Office
GPS	Global Positioning System
GLRI	Great Lakes Restoration Initiative
GLWQA	Great Lakes Water Quality Agreement
HEC	Huron-Erie Corridor
LCA	Lake Carriers Association
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MNFI	Michigan Natural Features Inventory
NAAQS	National Ambient Air Quality Standards Attainment Status
NEPA	National Environmental Policy Act
PAC	Public Advisory Council
PWQ	Ontario Provincial Water Quality
SEMCOG	Southeast Michigan Council of Governments
SHPO	State Historic Preservation Office
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WQS	Michigan Water Quality Standards

CO	Carbon monoxide
km	Kilometers
km^2	Square Kilometers
m^2	Square Meters
ug/m^3	Micrograms per meter square
mg/L	Milligrams per Liter
NO_2	Nitrogen dioxide
O_3	Ozone
Pb	Lead
$PM_{2.5}$	Fine particulate matter
PM_{10}	Coarse particulate matter
SO_2	Sulfur dioxide

SECTION 1 STATEMENT OF PURPOSE AND NEED

1.1 Project Introduction

The U.S. Geological Survey (USGS) Great Lakes Science Center (Ann Arbor, Michigan), in collaboration with a number of partners, is proposing to establish a series of native fish spawning reefs in the two large rivers (the St. Clair and Detroit Rivers) that connect two Great Lakes (Lake Huron and Lake Erie) in southeast Michigan (**Figure 1**). The proposed spawning reefs are essentially beds of loose rock and are intended to re-create habitat destroyed during the construction of commercial shipping channels. The project design and location are based on three pilot reef projects established in the river system over the past ten years. The reefs are designed to attract target native fish species that seek out rocky areas in fast flowing waters to deposit and fertilize their eggs (fish spawning). The projects described in this Environmental Assessment (EA) are an important part of the remediation process required by the U.S. – Canada Great Lakes Water Quality Agreement (1987 and 2012) for each of the rivers. For this reason, the USGS has already received funding for several of the proposed reef sites through the Federal Great Lakes Restoration Initiative, a program administered by the U.S. Environmental Protection Agency (EPA).

The proposed projects would remediate badly needed native fish spawning habitat by establishing several engineered spawning reefs made with natural rock. The reefs would be made with 4 to 8 inch angular limestone pieces, forming a bed of loose rock 2 feet thick on the river bottom under at least 25 feet of water and at least 200 feet from shore. The rock would be placed on the river bottom using a barge and crane. The spawning reefs would range from 1 to 4 acres in size with exact dimensions determined at each site in order to minimize impacts to infrastructure and existing aquatic habitat. Extensive research supports the design and locations of the proposed reef projects described below.

This Environmental Assessment (EA) describes the development of fish spawning reefs in five locations. The reef project team proposes to develop two spawning reefs on St. Clair River bottomland, providing up to 7 acres of newly created native fish spawning habitat. These projects are already funded and reefs could be completed by the end of 2014. In the Detroit River, the reef project team proposes to create spawning reefs in three locations over a period of five years as funding becomes available (**Figure 1**). The aerial extent for projects in both rivers are clearly defined in Section 2.

1.2 Purpose and Need

The St. Clair – Detroit River System, also known as the Huron-Erie Corridor (HEC), is bounded by the state of Michigan and the province of Ontario, Canada. It includes southern Lake Huron, the St. Clair River, Lake St. Clair, the Detroit River, and western Lake Erie. Both large rivers are considered connecting channels because water from the three upper Great Lakes (Superior, Michigan, and Huron) flows through these rivers and into Lake Erie at a rate of about 100 billion gallons per day (**Figure 1**).

1.2.1 Target Fish Species

The St. Clair – Detroit River System historically served as the spawning grounds for many native fish species that migrated from Lakes Huron and Erie into these rivers during spawning season. The proposed habitat remediation is intended to benefit a group of native fish with similar spawning habitat requirements, including: lake sturgeon (*Acipenser fulvescens*), a fish species that is listed as threatened or endangered in all but one of the Great Lakes states and provinces; lake whitefish (*Coregonus clupeaformis*), which supports the largest commercial fishery in the Great Lakes but has only recently

returned to the Detroit River; and walleye (*Sander vitreus*), a popular sport fish that supports a valuable recreational and commercial fishery in the Great Lakes. Other catfish and sucker species are also likely to benefit from the proposed habitat remediation, such as the state endangered northern madtom (*Noturus stigmosus*). During spawning season, this guild of native fishes seeks out rocky areas in fast-flowing waters to deposit and fertilize their eggs. Spawning habitat created by the proposed projects is designed to possess adequate interstitial spaces to incubate and protect fish eggs from being dislodged by water currents or consumed by predators that eat fish eggs.

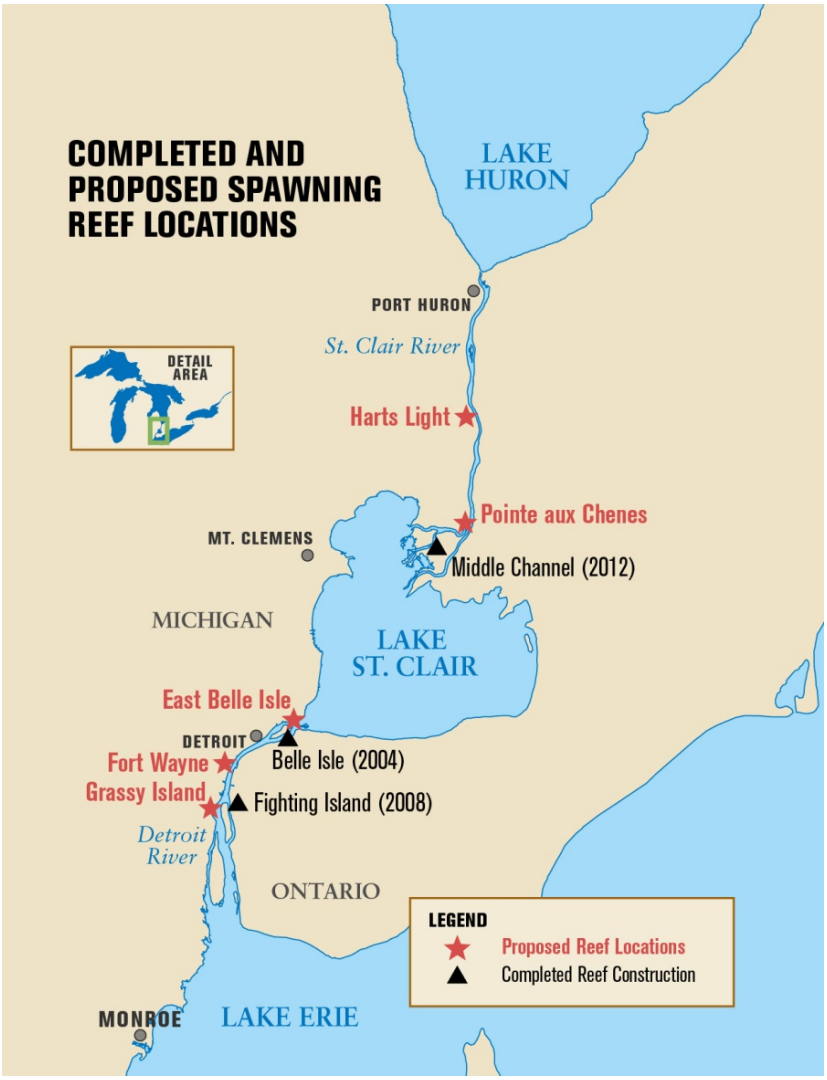

Figure 1. Regional Map of the St. Clair – Detroit River System

1.2.2 Historic Impacts to Fish Habitat

Remediation of fish habitat in the St. Clair – Detroit River System requires a thorough understanding of where and why habitat was sustained in the rivers historically (e.g., Goodyear and others, 1982) how changes in the river environment affected fish reproduction and survival (e.g., Bull and Craves, 2003), and what conditions fish require to reproduce and sustain themselves (Manny and Kennedy 2002,

Nichols et al. 2003, Caswell et al. 2004). The team leading the proposed projects have researched and published extensively on these questions (See Section 5, Sources Consulted).

Based on a number of studies and the documented success of three other reef projects previously constructed within the St. Clair – Detroit River System, scientists at the USGS Great Lakes Science Center have determined that large rocky substrate is needed to fulfill life history requirements of many fish species and that this type of habitat is very limited in the System. Extensive research about natural and created fish habitat in the St. Clair – Detroit River System indicates that creating and restoring fish spawning habitat is critical for the recovery of valuable native fish species. The proposed project would help to offset some of the historic destruction of the preferred spawning habitat of target fish species by creating spawning reefs on the bottomlands of the Detroit and St. Clair Rivers.

The need for the project is based on the loss of riverine ecological function and resilience caused by historic alterations to the hydrology and riverbed for navigational infrastructure. Beginning in 1874, the St. Clair – Detroit River System was systematically and extensively modified by the construction of deep water channels for commercial shipping. Large-scale blasting and dredging removed natural limestone bedrock reefs where millions of fish deposited their eggs (**Figures 2 and 3**). Dredged material was disposed of in and along the river, creating islands designed to force water flow through the designated shipping channels (water level compensating works). This process removed, covered or significantly reduced water flow at many historically productive fish spawning grounds (**Figure 4**). In the Detroit River alone, from 1874 to 1968, major construction projects created 60 miles (96.5 kilometers) of shipping channels (each 800 feet wide and 30 feet deep), removed over sixty million cubic yards of material, covered 10,000 acres (40.5 square kilometers) of river bottom with dredge spoils, and built 210 acres (85 hectares) of above-waterline compensating works at a total cost of US$283 million (Bennion and Manny 2011).

Figure 2. Detroit River Riverbed Dewatered Before Construction of the Livingstone Channel

Figure 3. Detroit River Riverbed Dewatered After Blasting and Dredging of Shipping Channel

The construction of commercial shipping channels throughout the St. Clair – Detroit River System has greatly reduced the quantity and quality of fish, wildlife, their habitat and the life-history connections between remaining habitats (e.g., spawning and nursery grounds). Shoreline development and changing land use have resulted in the loss and degradation of wetlands and other coastal habitats. Invasive aquatic species, poor water quality, urbanization and other factors have also severely impacted the health of these rivers. These and other impacts, including over fishing, have dramatically reduced populations of native fishes, particularly lake sturgeon. Despite the decline in population, the St. Clair and Detroit rivers continue to support one of the largest populations of lake sturgeon remaining in the Great Lakes, in part because most other large rivers in the region are dammed, making other possible spawning grounds inaccessible. If the lake sturgeon population in these rivers is able to grow, it could help re-populate other parts of the Great Lakes. In recent decades, non-spawning habitat stressors have been addressed, making this one of the last factors of concern.

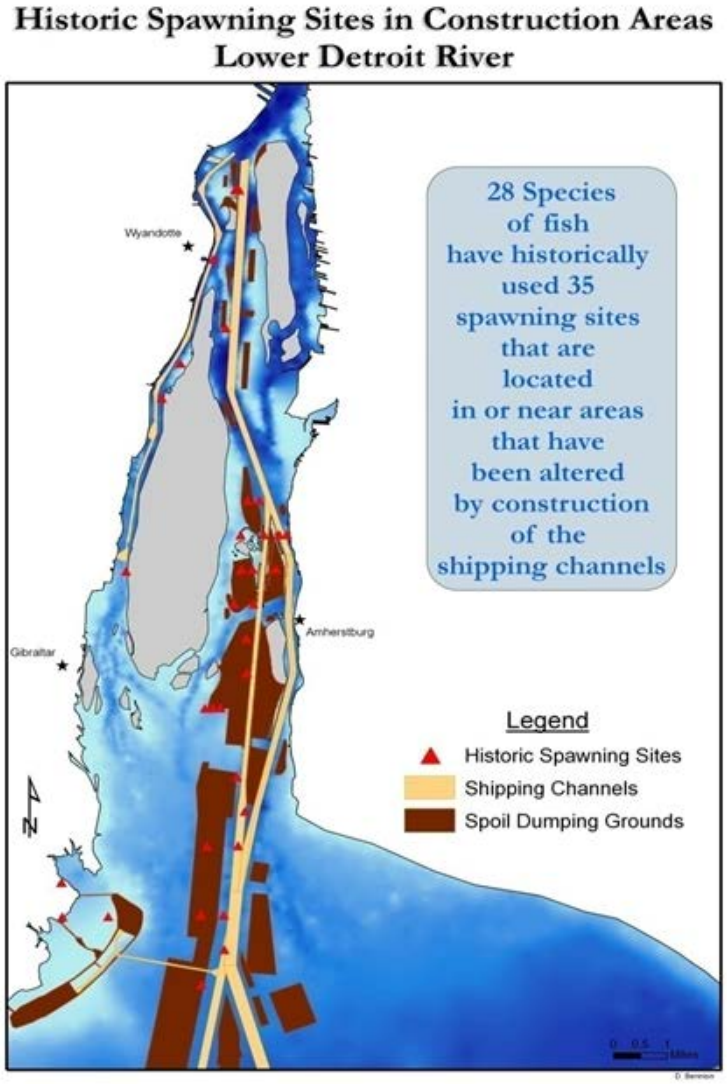

Figure 4. Historic Spawning Sites in Construction Areas of the Lower Detroit River (based on Goodyear et al. 1982)

1.2.3 Remediation of Areas of Concern

Both the St. Clair and Detroit Rivers were identified as Areas of Concern (AOCs) under the U.S. – Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol and the 2012 Amendment) because they experienced severe environmental degradation resulting in a number of Beneficial Use Impairments. The AOC program is administered by the U.S. Environmental Protection Agency (USEPA), the Michigan Department of Environmental Quality (MDEQ) and Public Advisory Councils set up for each AOC. The remediation plans for each Area of Concern have numerous aspects, including mitigation activities to eliminate the Beneficial Use Impairments for: 1) Loss of fish and wildlife habitat; and 2) Degradation of fish and wildlife populations. The proposed fish habitat remediation work described in this EA has been identified by the groups administering both AOCs as essential to addressing these two Beneficial Use Impairments related to fish and wildlife populations and their habitat. This habitat remediation work is cited in their reports outlining the process and projects necessary for delisting, which was updated in 2012 for the St. Clair River AOC and is being finalized for the Detroit River AOC in early 2014. Thus, the proposed work is part of a larger overall remediation effort of the rivers and for this reason the St. Clair River projects have already received funding through the Federal Great Lakes Restoration Initiative.

In specific terms, increasing habitat for native fish is one of the goals for addressing the ecological impairments in the Areas of Concern. In broader terms, this habitat remediation project would benefit the Great Lakes and the Huron-Erie Corridor ecosystem by restoring and improving ecological function and resilience, resulting in a healthier, more diverse, and productive ecosystem that would, in turn, provide societal, economic, and environmental benefits to the Great Lakes region.

1.2.4 Research Strategies and Consensus-Based Approach

The Huron-Erie Corridor Initiative and its “Science Team” were formed in 2004 to determine research strategies and direction, establish collaborations, and pursue funding opportunities using a consensus-based approach (Manny et al. 2005a). It is comprised of partners who manage and protect this ecologically and economically valuable Corridor or provide science-based support to those management agencies; it includes state and federal agencies, University and private partners (See Section 4.2: Agency Coordination). The Science Team, (led by the USGS Great Lakes Science Center) has concluded that providing artificial spawning reef materials designed for native fish species is critical to addressing fishery habitat and population restoration needs in the St. Clair – Detroit River System (Manny et al. 2005b).

In the summers of 2004, 2008, 2012 and 2013, spawning reef projects were constructed at three different locations in the St. Clair – Detroit River System (Table 1). The USGS and U.S. Fish and Wildlife Service (USFWS) provided scientific guidance and conducted pre- and post-restoration assessment for all the projects, drawing upon their unique field research capacity. For projects in U.S. waters, including the ones proposed in this EA, Michigan Sea Grant and the Water Center, units within the University of Michigan, played the role of grant fiduciary and oversaw the bidding and contracting for engineering and reef establishment. SmithGroupJJR was responsible for design, engineering, permitting and oversight of project implementation. Individuals from each of these organizations contributed to this EA, drawing upon their history of piloting and refining methods for spawning habitat remediation in the Huron–Erie Corridor. Previous reef projects in U.S. were reviewed by state and federal permitting agencies; NEPA review resulted in a Categorical Exclusion or a Finding of No Significant Impact (See Section 4.2 Agency Coordination and Appendix A for letters from federal funders.)

Table 1. Summary of Completed Reef Projects

Completed Reef Projects	Reef Size	Rock Types	Primary Funders	Lead Organization	NEPA Compliance
Belle Isle Reef, Detroit River, 2004	3 reef beds, 0.28 acres total	1 – 4 inch coal cinders, 4 - 12 inch cobble stone and 8 – 16 inch broken limestone	NOAA/MDEQ Coastal Management Program; Great Lakes Fishery Trust	The University of Michigan, Michigan Sea Grant	NOAA facilitated Categorical Exclusion
Fighting Island Reef, Detroit River, 2008	12 reef beds, 0.82 acres total	4 – 20 inch limestone, 2 – 4 inch limestone, natural rounded stone and mixture	Environment Canada, BASF, DTE, MI Wildlife Conservancy	Essex Region Conservation Authority	Canadian permits and approvals
Middle Channel Reef, St. Clair River, 2012	9 reef beds, 1 acre total	4 – 8 inch limestone, 4 – 6 inch rounded field stone and mixture	NOAA Great Lakes Restoration Center, U.S. Fish and Wildlife	The University of Michigan, Michigan Sea Grant	NOAA Programmatic Environmental Assessment
Fighting Island Reef Expansion, Detroit River, 2013	1 reef unit,1 acre total	15 - 30 cm gabion stone	Environment Canada, Ontario Ministry of Natural Resources, DTE	Essex Region Conservation Authority	Canadian permits and approvals

Post remediation assessment at each of the projects in Table 1 revealed an immediate positive native fish response, including increased abundance of northern madtom, an endangered fish in the State of Michigan and the documented spawning of lake sturgeon, a threatened species in the State of Michigan (Roseman et al. 2011; Manny and Mohr 2013; Manny et al. in review,). Lake whitefish eggs were also collected on the constructed reefs, the first documented spawning event in the Detroit River for this fish in nearly 70 years, highlighting the importance of increased spawning habitat to the recovery of this population (Roseman et al. 2007, 2012). Results are further discussed in Section 3.12.2: Cumulative Impacts.

As a result of the success of the completed spawning reef projects in the St. Clair and Detroit Rivers, the federal Great Lakes Restoration Initiative (GLRI) has funded the USGS Great Lakes Science Center to establish spawning reefs at two locations within the St. Clair River. This funding opportunity has initiated the writing of this EA. Potential future funding may become available to create additional reefs in the Detroit River as described in this EA. The reef project team was awarded a smaller grant from the National Fish and Wildlife Foundation in 2012 to construct an acre of spawning habitat at one of the three proposed locations in the Detroit River. This grant has enabled some preliminary site evaluation and coordination with the Michigan State Historic Preservation Office (SHPO), permitting agencies and the USFWS NEPA compliance office, which is referenced in this EA. It is likely that the USGS would receive additional funds to expand this project to 3 – 4 acres as outlined in the Detroit River Area of Concern Remediation Plans.

1.2.5 Scoping and Issues

The topics of discussion in this EA are focused on those topics/issues that have the potential to be impacted, either positively or negatively by the proposed actions described. Following guidance as presented in the document, Implementation of the National Environmental Policy Act of 1969 (Part 46), "Scoping is a process that continues throughout the planning and early stages of preparation of an environmental documentation under the National Environmental Protection Act (NEPA). Scoping may be helpful during preparation of an EA, but is not required (paragraph 46.305(a))." Scoping has occurred for this proposed action through open communication of the Huron-Erie Corridor Initiative.

The Huron-Erie Corridor Initiative was established in 2004 by the USGS Great Lake Science Center to facilitate discussion between scientists and natural resource managers and ultimately create relevant new science that would assist resource managers in making decisions concerning restoration of native aquatic species and their habitats in the Huron-Erie Corridor (Manny et al. 2005a). The Initiative is a bi-national, collaborative partnership of over 25 organizations, including government, industry, tribal, and university participants. Resource managers, scientists, and other stakeholders are using a consensus-building, multidisciplinary approach to identify research themes and priorities, develop funding strategies, and increase public involvement in the Initiative. This group includes the most experienced and active researchers in the Huron-Erie Corridor.

Based on scoping and open communications with the Huron-Erie Corridor Initiative, topics/issues that result in potential impacts, both positive and negative, to socioeconomic, environmental and natural resources are identified and evaluated. Some topics/issues typically found in standard EA formats are strategically omitted because they do not occur, have no relevance or do not represent any potential impacts (e.g. Farmlands, Wetlands, or Vegetation).

1.3 Decision to be Made

The USGS Responsible Official would make the final decision regarding which action to take on the basis of the agency mission, legal mandates, and public input on this EA.

In accordance with NEPA, the Responsible Official must determine if the preferred alternative would have a significant impact on the quality of the human environment. If there is no significant impact, the USGS would issue a Finding of No Significant Impact (FONSI). If there is a significant impact, additional analysis may be required in an Environmental Impact Statement (EIS), or the Responsible Official may choose to take No Further Action. If the FONSI and Decision Record are signed, the USGS would begin implementing the chosen alternative.

1.4 Legal Mandates

USGS projects are required to comply with Federal, State, and Local substantive and procedural requirements, and with any applicable Federal, State, and Local requirements or Executive Orders that are more stringent than those listed in the USGS Manual (USGS, 2002, Chapter 1, Section 1.A(2)).

SECTION 2 ALTERNATIVES CONSIDERED

2.1 Basis for Alternatives Considered

In response to a need for objective scientific information that could be used to delist Beneficial Use Impairment 14 (Loss of fish and wildlife habitat) in the St. Clair River and Detroit River International Areas of Concern, a large-scale geographic mapping investigation was developed to identify areas of highest potential for fish habitat remediation (Bennion and Manny in press). The resulting geospatial, bio-physical model integrated data on two variables that many native riverine fishes respond to in selecting where to spawn in the St. Clair – Detroit River System: water velocity and depth. The bio-physical model mapped these two physical components of fish habitat in the rivers using geographic information system (GIS), and identified where, theoretically, fish spawning habitat could be best remediated. The target fish species to which this model applies is lake sturgeon, but spawning reefs constructed for lake sturgeon in this system have been used for spawning by 17 additional species of native fish. The analysis revealed areas in each river that possessed suitable water velocity and depth for fish spawning and therefore could serve as remediation areas by the addition of rock-rubble substrate like that used at two previous remediation sites in the Detroit River at Belle Isle and Fighting Island. Results of the analysis revealed that only 3 percent of the total area of the St. Clair and Detroit Rivers possesses the necessary combination of suitable water depth and high flow velocity to be indicated by the model as potential spawning habitat for lake sturgeon.

Figures 6, 7 and 8 illustrate model outputs for each section of the river.

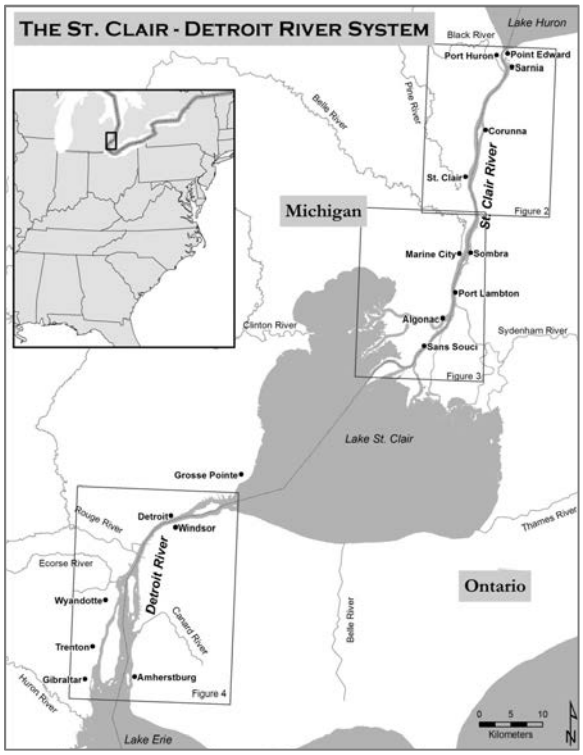

Figure 5. Regional Map of Modelling Locations.

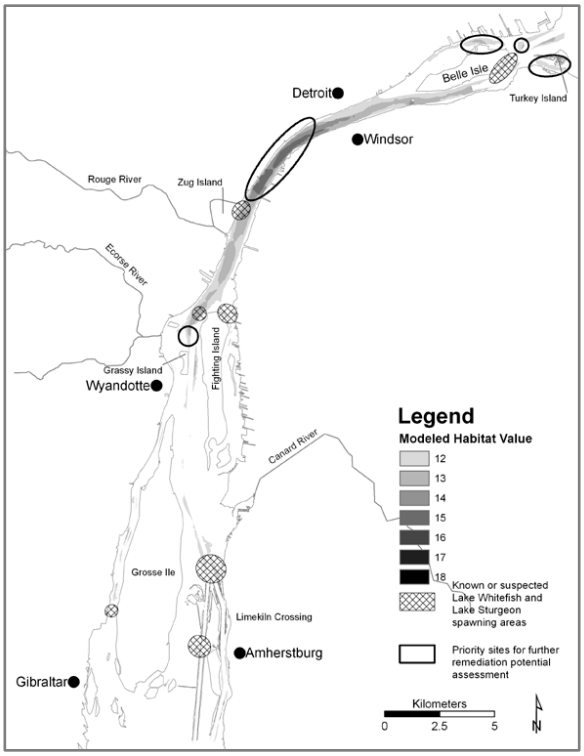

Figure 6. Potential Spawning Reef Locations in the Detroit River

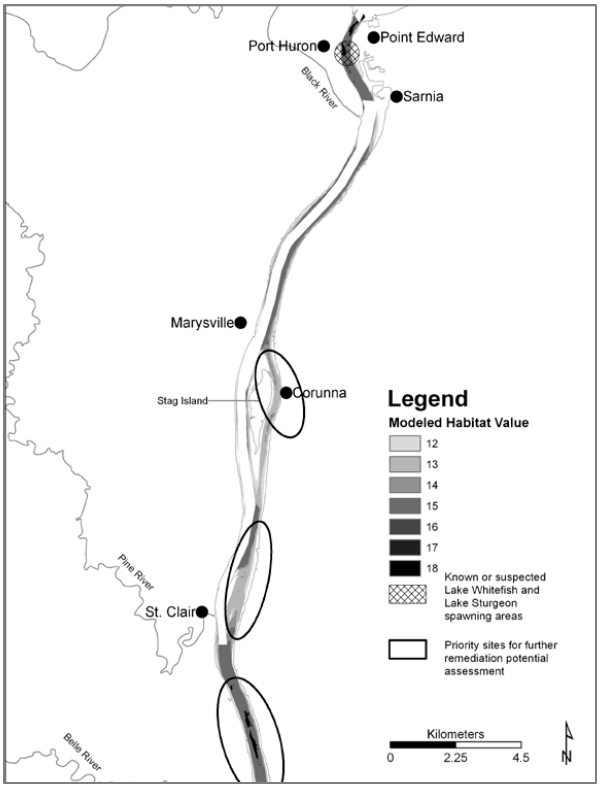

Figure 7. Potential Spawning Reef Locations in the Upper St. Clair

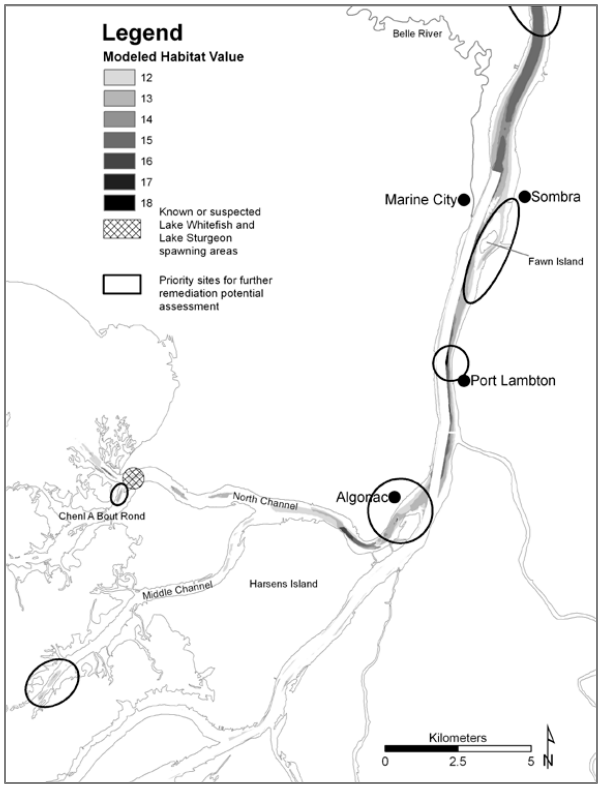

Figure 8. Potential Spawning Reef Locations in the Lower St. Clair

The final model output identifies and ranks 3,681 acres (14.9 km^2) of potential lake sturgeon spawning habitat for the Detroit River (**Figure 5 - 6**), and 4,744 acres (19.2 km^2) of potential spawning habitat in the St. Clair River (**Figures 7 - 8**). The model excludes dredged shipping channels, but does not take into account a number of other siting factors such as proximity of spawning and nursery areas, contaminant concentrations, boat traffic, marine infrastructure and shoreline ownership, which further limit the extent of potential remediation areas. As explained earlier, the area identified for potential fish habitat remediation is far smaller than the historic river bottom habitat that was damaged or destroyed.

2.2 Alternatives Considered and Dismissed

This EA assumes there are no unresolved conflicts about the proposed action with respect to alternative uses of available resources and therefore does not consider additional alternatives, including the no action alternative. Utilizing the bio-physical model results outlined above, detailed investigations were performed at various key locations to determine specific proposed sites for creating spawning reefs. The site selection process and specific proposed sites are as described in more detail below.

2.2.1 Site Selection

In addition to the model outputs, identification of specific sites for establishing native fish spawning reefs was determined using a variety of data collected by the USGS, USFWS, and Michigan Department of Natural Resources (MDNR). Initial siting was driven by results of the bio-physical model that identified prime areas, outside of dredged shipping channels, where current and depth were optimal for spawning by target fish species. Several sites were considered and dismissed throughout the St. Clair River during

this modeling process, with the Hart's Light area (about 2.5 miles (4 km) south of the City of St. Clair) in the main channel and the Pointe Aux Chenes bend (at the City of Algonac) in the North Channel achieving the highest model scores for sites in U.S. waters. In the Detroit River, the Fort Wayne area located just off Historic Fort Wayne achieved the highest score.

Egg deposition rates were surveyed at up to six locations within proposed remediation sites to determine relative fish spawning activity, as compared to spawning activity observed throughout the System. Gangs of egg mats were deployed at sites throughout the proposed remediation areas in fall 2012, and spring 2013. Each gang was retrieved from the bottom and inspected for eggs on a weekly basis.

After the approximate sites were confirmed, surveys of the surficial sediments were conducted using side-scan sonar to determine the composition and extent of the bottom substrates. Multiple sonar transects were conducted at each site to provide shore-to-shore coverage over a 2 to 2.5 mile stretch of the river in order to select target reef locations. Follow up underwater video surveys of the sites were conducted using a remote "drop-camera" which provided real-time images of the bottom substrates to the operators on the river surface. Global Positioning System (GPS) positional data were overlain on the video image in order to spatially locate the specific video images with the corresponding sonar imagery. Sonar and video data allowed the team to ground-truth model output, determine substrate composition and distribution, and select specific coordinates for spawning reefs.

Resulting analysis of the sonar imagery indicated a considerable amount of small (2 to 3 m^2) to larger (10+ m^2) objects scattered throughout the St. Clair River sites. Analysis of the underwater video at these locations indicated that a majority were debris fields, primarily old wooden structures, tree trunks/logs, etc., that were acting as refuge for many different fish species. Each debris field was mapped on the sonar imagery and catalogued, with a corresponding GPS location. It was decided that reefs would be sited to avoid the debris, since they appear to provide habitat for existing fish populations.

The reef project team specifically selected sites where the river bottom consisted of hard-pan clay with little or no loose sediments. As discussed below (Section 3.1), hard-pan clay can physically support the engineered spawning reefs while typically supporting little aquatic life. This type of bottomland is smooth, solid and free of on-going sediment deposition, minimizing the risk of sediment accumulating in the reef.

2.3 Preferred Alternative

The Preferred Alternative would remediate badly needed native fish spawning habitat by establishing several engineered rock reefs utilizing 4 to 8 inch angular limestone. The reef sites would range from 2 to 4 acres in size with exact dimensions determined at each site in order to minimize impacts to infrastructure and existing aquatic habitat. The scientists at the USGS Great Lakes Science Center have determined that large rocky substrate is needed to fulfill life history requirements of many fish species and is very limited in the St. Clair – Detroit River system. Based on USGS research, restoring spawning reefs that target native species is seen as an essential strategy for sustaining and restoring native fish communities. This project is mitigation that would remediate the loss of fish and wildlife habitat by providing rock reefs for fish spawning in the Detroit and St. Clair Rivers.

The Preferred Alternative includes two projects in the St. Clair River that would be completed by the end of 2014 and three projects in the Detroit River that could be developed over a period of five years, as funding becomes available.

2.3.1 St. Clair River Projects

The St. Clair River projects consist of two sites with water depths between 35 to 45 feet. The Hart's Light Reef would be located 280 feet offshore of East China, Michigan, in the main stem of St. Clair River. The reef project could be up to 4 acres in size and split into two units that are 75 feet apart. The northern unit is approximately 798 feet L x 165 feet W x 2 feet D. The southern unit is approximately 270 feet L x 165 feet W x 2 feet D (**Figure 9**). The second St. Clair reef site, Pointe Aux Chenes, is located 300 feet offshore of the City of Algonac, Michigan, in the North Channel of the St. Clair River in 35 feet of water (**Figure 8**). This site is proposed to be 3 acres in size with dimensions of 527 feet L x 250 feet W x 2 feet D. Both projects utilize 4 to 8 inch angular limestone with a 2 foot cross section (**Figure 11)**.

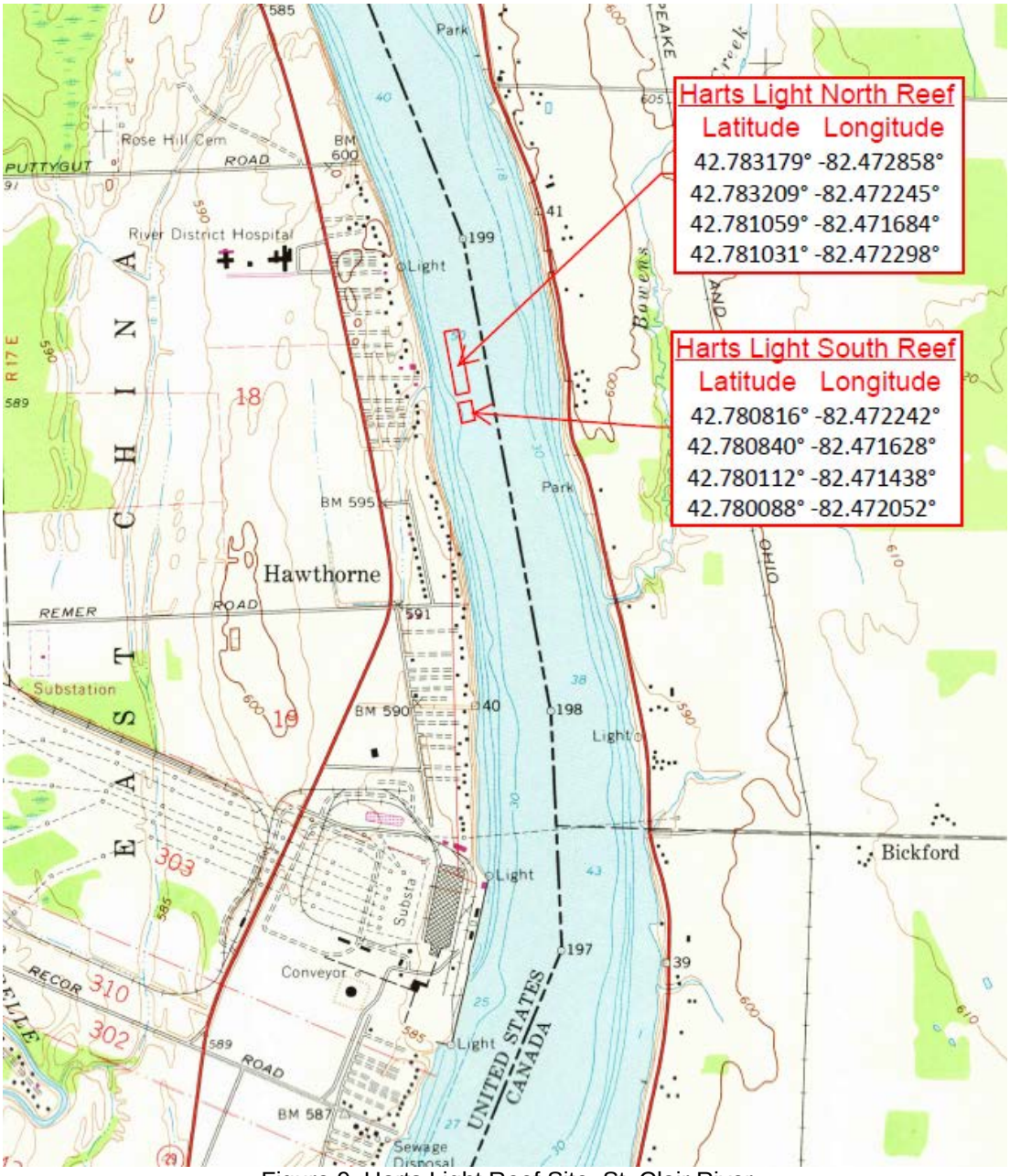

Figure 9. Harts Light Reef Site, St. Clair River

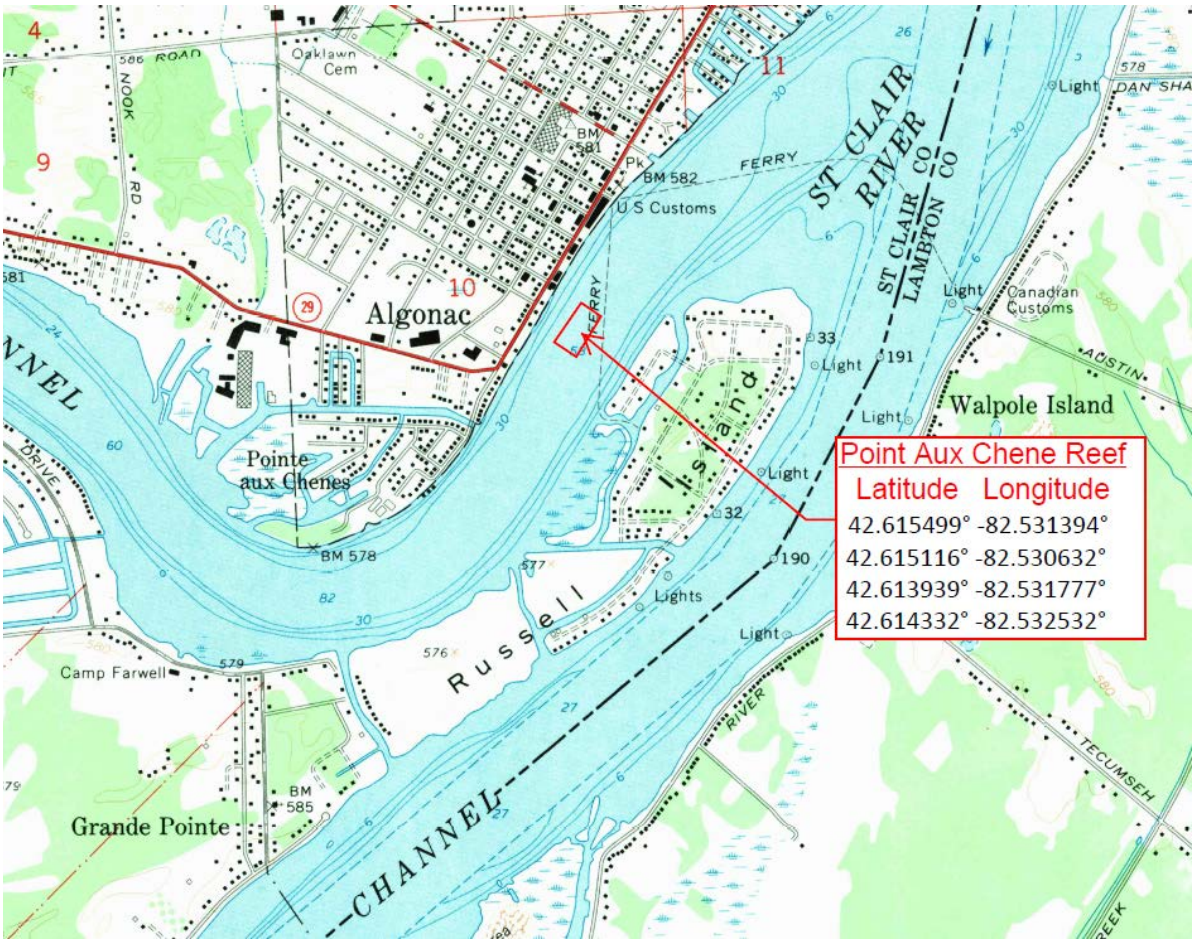

Figure 10. Point Aux Chenes Reef Site, St. Clair River

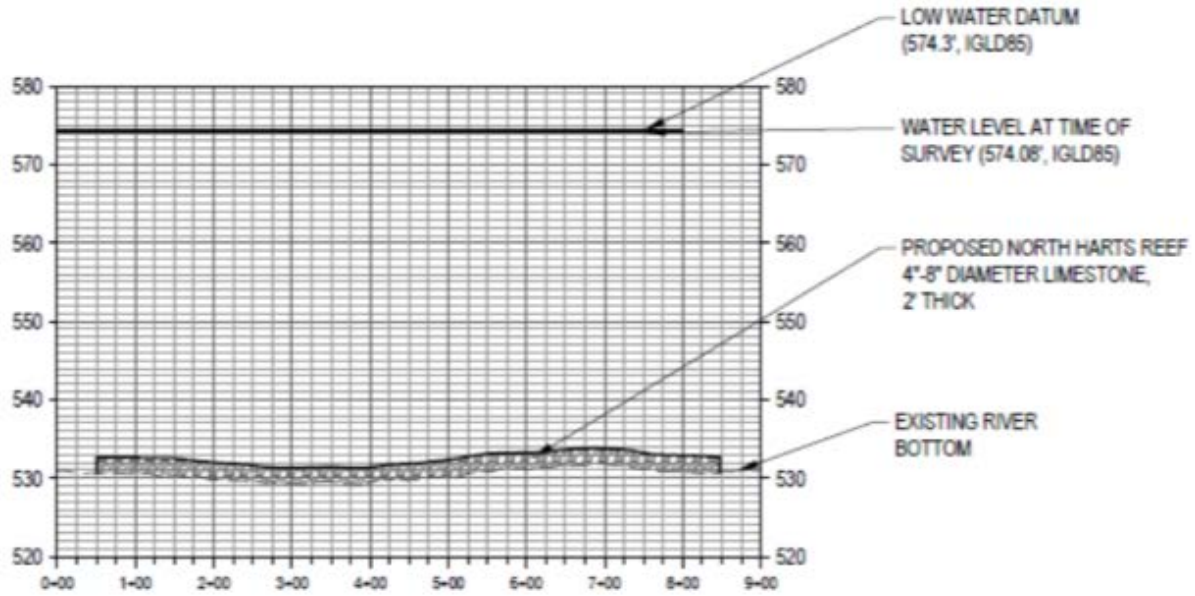

Figure 11. Typical Latitudinal Reef Cross Section (Harts Light North)

The Hart's Light and Pointe Aux Chenes sites ranked as the highest priority sites for native fish spawning based on: 1) Output from the bio-physical model for the St. Clair River; 2) Fall 2012 and spring 2013 field investigations of egg deposition on mats and drifting fish larva; and 3) Results from side-scan sonar and underwater video surveys. Contractors specializing in marine work would be hired through a competitive bidding process to establish the reefs, overseen by the University of Michigan's Purchasing Department. The Preferred Alternative St. Clair River projects would be completed by the end of 2014, and could provide up to 7 acres of spawning habitat for target fish species (lake sturgeon, walleye and lake whitefish).

2.3.2 Detroit River Projects

Detroit River locations were identified using the same combination of GIS modeling and field data collection as described in Section 2.2.1. Three areas in U.S. waters were ranked very high, using the results of the bio-physical model, and have been identified as target projects for addressing habitat degradation in the Detroit River Area of Concern. The three proposed Detroit River reef sites are: 1) Upstream of Belle Isle (**Figure 12**), 2) Offshore from Historic Fort Wayne (**Figure 13**); and 3) Upstream of Grassy Island (**Figure 14)**. At both the Grassy Island and Belle Isle sites, the team has identified an area 20 to 30 acres in size that could be suitable for reef development. Further field assessment is needed to select specific reef location within this larger area. It is anticipated that the water depth and reef dimensions would be similar to the St. Clair River projects. The Detroit River projects could provide an additional 9 acres of fish spawning reef habitat in the areas identified. These reefs could be designed and established over the next five years, as funding becomes available.

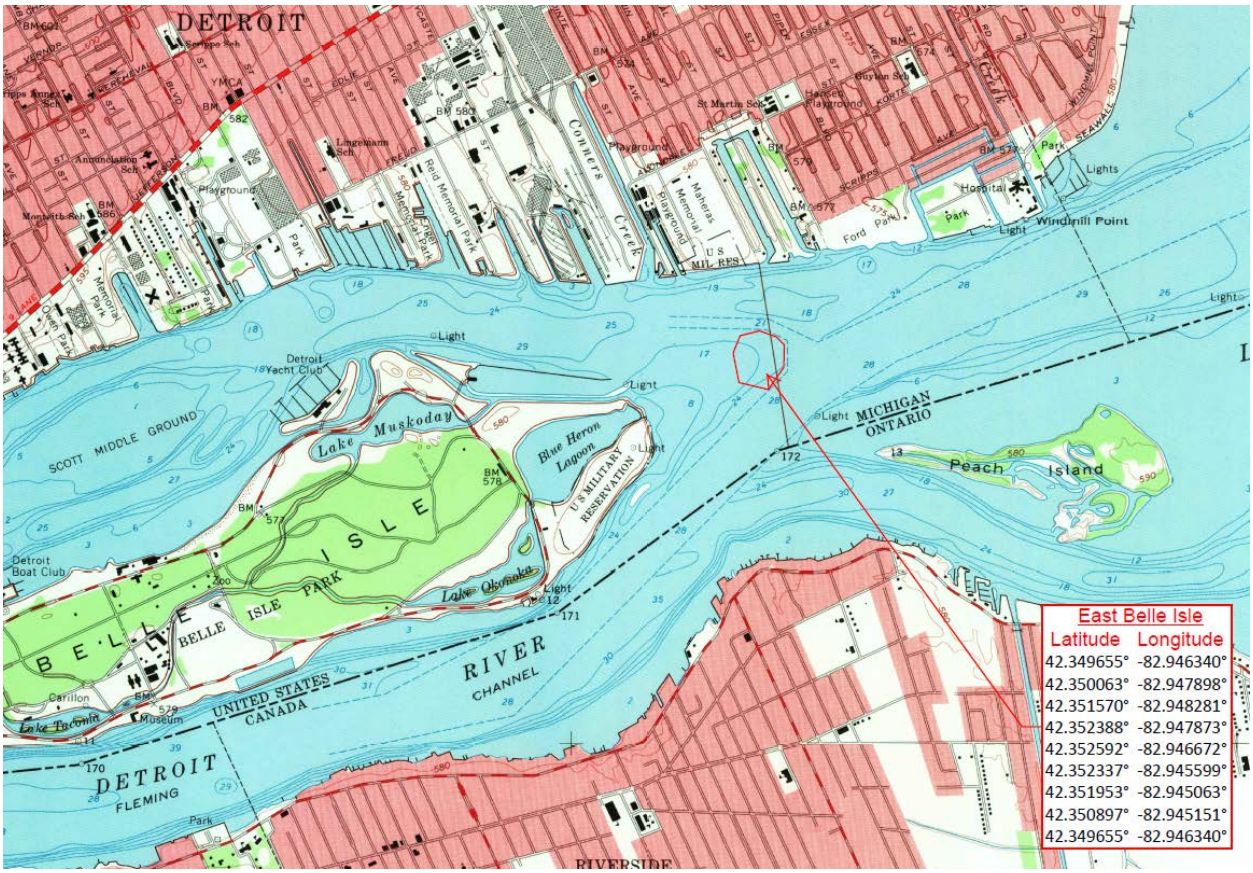

Figure 12. East Belle Isle Reef Area, Detroit River

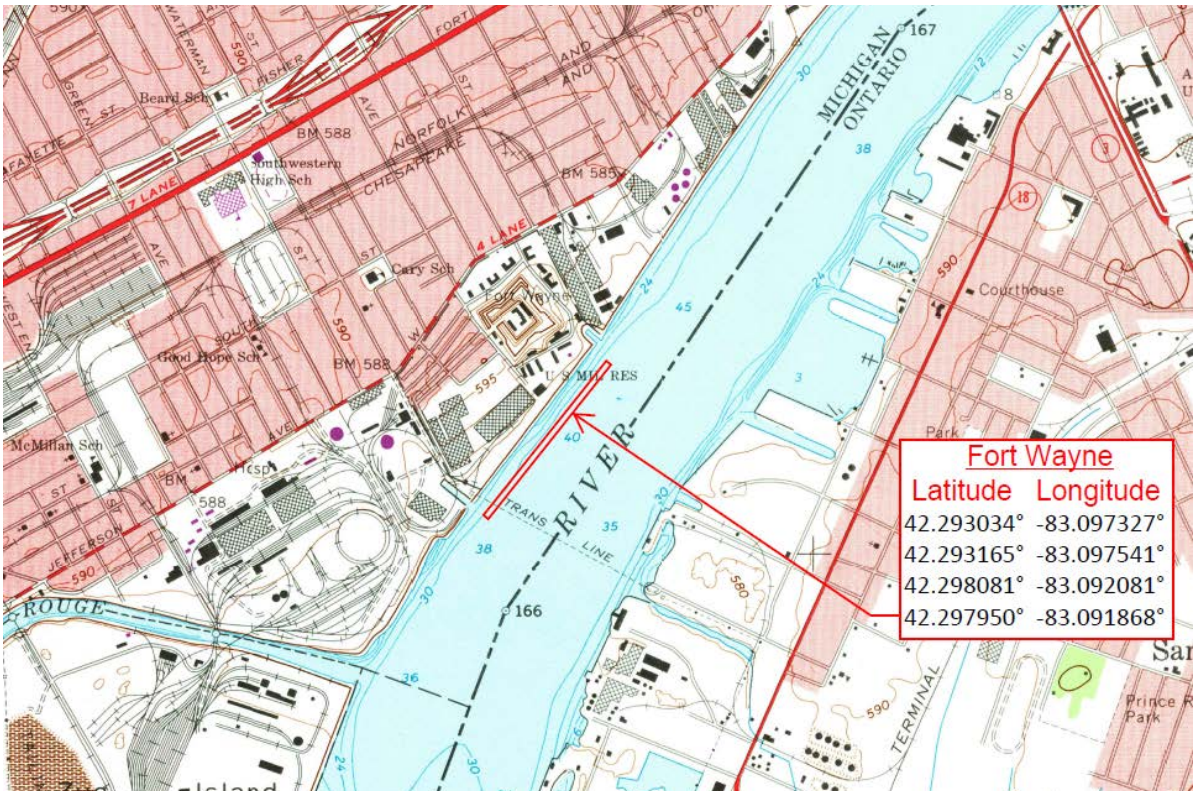

Figure 13. Fort Wayne Reef Area, Detroit River

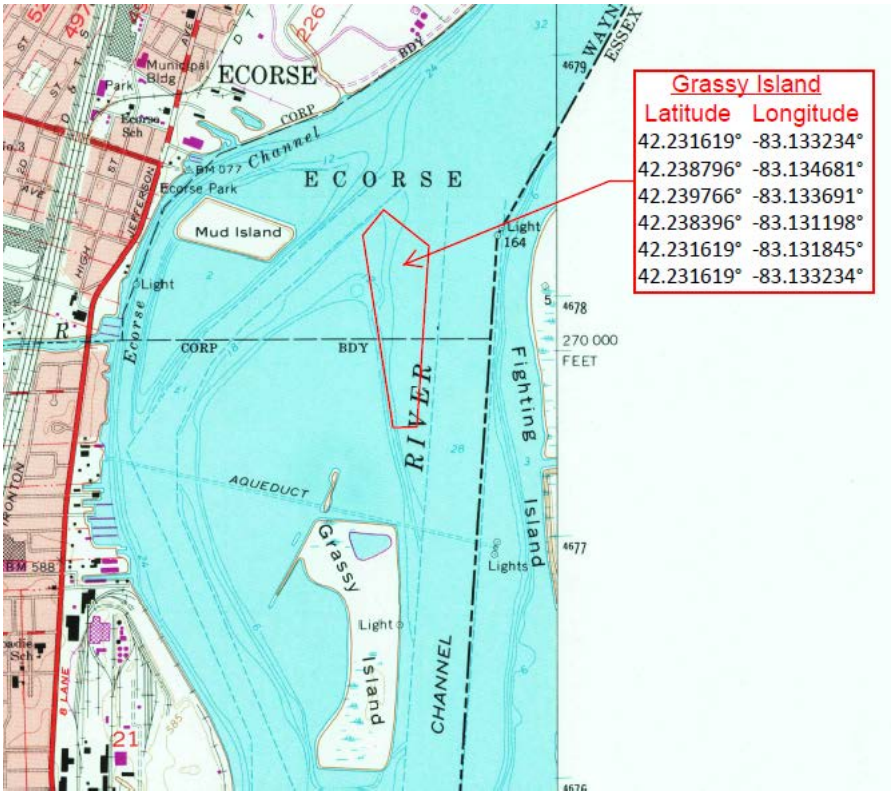

Figure 14. Northeast Grassy Island Reef Area, Detroit River

2.3.3 Project Monitoring

In addition to the physical assessment and modeling that inform reef site selection, the reef project team conducts rigorous pre- and post-remediation monitoring. This has allowed the team to learn from past experiences and improve scientific understanding of fish ecology and spawning habitat remediation over time using an adaptive management framework. A number of partners contribute to reef monitoring, including scientists from the USGS, USFWS, MDNR and the University of Michigan. In some cases, additional assessment of juvenile fish communities, spawning and nursery habitat linkages, fish population genetics and fish movements, using telemetry, are included when funding allows. Below is a brief summary of the core monitoring and assessment program for each reef project. Past project results are later discussed in Section 3.12.2: Cumulative Impacts and a number of publications and theses are listed in Section 5: Sources Referenced.

Physical Assessment: The team uses a variety of equipment, including sonar, underwater video, and an Acoustic Doppler Current Profiler, to evaluate water flow and characterize the river bottom before and after reef development. Video and direct observations through scuba diving are essential for evaluating the accuracy of the reef rock placement and the condition of the reefs in the years after the reefs are built.

Adult Fish: Partners from the USFWS typically lead the assessment of adult fish use of the remediation area using set-lines, gill nets and trap nets before and after reef development. This information allows the team to evaluate which fish are using the reef, which fish are "spawning ready" when visiting the reef, and how the reef has changed fish use of the area.

Egg Deposition: USGS scientists have developed a unique method for measuring fish egg deposition in large, busy rivers like those of the Huron-Erie Corridor (Roseman 2011b). Before and after reef establishment, egg mats are placed on the river bed above and below the proposed reef site within a 1-2 km reach of the river. Additional egg mats are placed within the specific site before reef establishment and directly on the reef beds after rock is placed. Egg mats are measured on a weekly basis through the spring and fall spawning seasons. Mats are brought to the water surface and fish eggs are picked off the mats, counted and brought back to the laboratory for incubation and identification when larvae emerge. Measures of egg deposition by species on a per area basis throughout the season provide an excellent indicator of spawning activity on the reef and in the surrounding area.

Larval Production: USGS scientists use bongo nets and D-frame drift nets to evaluate the numbers and types of larvae emerging and drifting off the reef. Nets are deployed in the evening when larvae typically begin drifting and the nets must be emptied and measured every two hours to ensure a representative measurement of larval drift. Fish larvae estimates are essential for evaluating whether the reef environment adequately incubates eggs and allows eggs and larvae to survive, a challenging aspect of fish habitat remediation and evaluation that is sometimes overlooked. A number of partners are looking for additional ways to track the survival of larvae and juveniles after they leave the spawning reef environment.

2.4 No Action Alternative

The "No Action Alternative" is utilized as the baseline against which the potential effects of the proposed alternatives are compared. In this case the No Action Alternative would mean that native fish spawning habitat would not be remediated by establishing engineered rock reefs, and the resulting effect from taking no action would be the continued impairment of the St. Clair – Detroit River System's native fish community.

Based on years of research within the St. Clair – Detroit River System, scientists at the USGS Great Lakes Science Center have determined that large rocky substrate is needed to fulfill life-history requirements of many fish species and that this type of habitat is very limited in the System. The lack of suitable fish spawning habitat is seriously affecting the recovery of valuable native fish species. The loss of riverine ecological function and resilience caused by historic alterations to the hydrology and riverbed for navigational infrastructure has been clearly documented as described in Section 1.2.2. The construction of commercial shipping channels throughout the St. Clair – Detroit River System has greatly reduced the quantity and quality of fish, wildlife, their habitat and the life-history connections between remaining habitats (e.g., spawning and nursery grounds). Shoreline development, loss and degradation of wetlands, invasive aquatic species, poor water quality, urbanization and other factors have also severely impacted the health of these rivers. These impacts have dramatically reduced populations of native fishes.

The No Action Alternative would result in the continuation of the loss and degradation of important spawning and nursery habitat, loss of the connections between spawning and nursery habitats, and continued bottleneck that reduces fish recruitment. The St. Clair – Detroit River System would continue to be designated with a Beneficial Use Impairment for the Loss of Fish and Wildlife Habitat in the Great Lakes AOC. The extensive effort to help populations recover would be hindered for native fish species including: lake sturgeon (*Acipenser fulvescens*), a state threatened species; northern madtom (*Noturus stigmosus*), a state endangered species; and lake whitefish (*Coregonus clupeaformis*), which supports the largest commercial fishery in the Great Lakes but has only recently returned to the Detroit River.

SECTION 3 ENVIRONMENTAL IMPACTS

Based on continuous scoping and open communications with the Huron-Erie Corridor Initiative and its science team, topics/issues that result in potential positive and negative impacts to socioeconomic, environmental and natural resources are identified and evaluated in this section of the EA. Some topics/issues typically found in standard EA formats are strategically omitted because they do not occur, are not relevant or do not represent any potential impacts (e.g. Farmlands, Population, Wetlands, or Vegetation).

3.1 Topography and Soils

As with much of the interior of southeastern Michigan bordering the Lake Huron and Lake Erie basin, the project region consists of flat, poorly drained, glacial lakebed sediments ranging from 628 to 635 feet above mean sea level. The physiographic geology is generally the product of extinct glacial lake and beach-line deposition. The bottomland of the Detroit River and St. Clair River once provided spawning habitat within an exposed honeycombed limestone bedrock shelf that has since been removed, covered or damaged during creation of the shipping channels. Today the river bottomlands are composed of small areas of limestone rock outcroppings, hard-pan stiff clay, small patches of gravel and cobble and soft sediments carried in and deposited along the shore from tributaries and on-shore land uses.

All of the proposed sites for reef development have been located in areas with hard-pan clay river bottom, 200 to 400 feet offshore. Hard-pan clay provides a solid base for angular 4 to 8 inch natural limestone engineered for the artificial reefs. Hard-pan clay does not support habitat of diverse aquatic populations of benthos, fish or plants. Because of the high flow within the water column over hard-pan clay, this bottomland does not act as a trap for fine sediments often associated with organic contaminated stormwater discharge.

The typical cross section of the artificial reefs provide a 2 foot elevation change on the bottomland under 30 to 40 feet of water (see **Figure 11** above). This elevation change is minor relative to the undulating topography of the rivers' bottomland and does not represent a potential impact to ecological, commerce or recreational uses of the river.

Establishment of rock reefs on hard-pan clay would not cause short- or long-term adverse impacts on the topography or soils of the project areas. The No Action Alternative would not result in any addition effect on topography or soils.

3.2 Utility Impacts

Underwater utilities including underwater gas lines, communication cables, water mains and power lines have been identified around the proposed reef locations. Underwater utilities have been avoided throughout all siting and design aspects of the proposed reefs. There would be no impacts to utilities as a result of the proposed actions. In addition, the state and federal permitting agencies would evaluate each potential reef site for potential impacts to commercial or municipal infrastructure including utilities, docks and navigation channels. The No Action Alternative would not result in any addition effects on existing utilities.

3.3 Social Impacts

Social impacts are associated with the relocation of residences or businesses; altering transportation patterns; dividing or disrupting established communities; or disrupting orderly, planned development.

Implementation of the proposed project does not result in the relocation of any residences or businesses, nor does it negatively alter existing transportation patterns.

The proposed habitat remediation projects are located in two Great Lakes connecting channels that are busy commercial shipping routes. As such, the potential impact on commercial navigation was carefully considered when designing and siting each project. The reef project team consulted directly with the Lake Carriers Association (LCA) before finalizing the plans presented in this EA. LCA is a trade association that promotes the common interests of its members — owners and operators of Great Lakes-licensed vessels that transport cargo. Mr. Glen Nekvasil, Vice President of the LCA, forwarded several iterations of the proposed St. Clair River and Detroit River projects to his members between July and November of 2013. Their feedback on each location is summarized here and example correspondence is included in Appendix B.

3.3.1 Harts Light Reef (St. Clair River)

The proposed Harts Light Reef is located in the main stem of the St. Clair River in a section that is narrow and deep. Although not dredged, this section is considered part of the federal navigation channel. Vessels travel either up or down river and have no reason to turn in this area and there are no commercial docks in the vicinity of the Harts Light Reef. There is a wide turning basin a mile downstream from the proposed reef that is used by vessels supplying the DTE St. Clair Power Plant. Up and down bound vessels typically travel close to the river center line (the international boundary). However, when passing another vessel, ships could traverse within 100 feet of the Harts Light Reef. Based on analysis conducted by our project engineers and USGS scientists, we are confident that the moderate level of turbulence caused by up or down bound vessels would not disrupt reef material or fish use of the reefs.

The LCA was concerned with an earlier layout for the Harts Light Reef and vessels involved with placing rock or studying the reef could pose a hazard for commercial navigation. The reef project team carefully considered how the reefs could impact and be affected by commercial vessels. Based on feedback from the LCA, the reef project team revised plans before submitting permit applications, creating a narrower reef foot print that is located in deep water close to shore. The revised layout as presented in this EA keeps the reefs within 450 feet of shore and outside the area typically traveled by commercial vessels. The LCA also requested that any portion of the reef that is within the federal navigation channel be at least 8 feet lower than project depth based on Low Water Datum to avoid any potential impediment to navigation. The proposed layout meets these specifications.

The U.S. Army Corps of Engineers (USACE) solicited additional feedback about the proposed Harts Light Reef and carefully considered potential impacts for commercial navigation before ultimately awarding a permit for the project. The reef project team was asked to provide additional information to USACE and confirmed that commercial navigation would not be held liable for any potential damage to the Harts Light Reef. In addition, all vessels working on the reef will maintain communication with the U.S. Coast Guard and Sarnia Marine Communications and Traffic Services and will yield to commercial vessels if requested.

The proposed Harts Light Reef is located adjacent to private homes on River Road in East China Township, Michigan. The bottomlands of inland rivers, as well as Great Lakes connecting channels, are not public trust land like the Great Lakes bottomlands. Upland property owners have some ownerships rights over the adjacent riparian bottomlands and their permission was needed in order to secure a permit from MDEQ. This process is described below, under Section 4.3 Public Involvement.

3.3.2 Pointe Aux Chenes Reef (St. Clair River)

The proposed Pointe Aux Chenes Reef is located in the North Channel of the St. Clair River, which breaks from the main stem of the river at the very head of the St. Clair delta, approximately nine miles before the river empties into Lake St. Clair. Commercial vessels do not travel through the North Channel, but the channel is heavily used by recreational boaters. This section of the river is narrow, deep, fast-flowing and one side of the river is hardened with a seawall. Boat traffic can be heavy during summer weekends and large speed boats and cabin cruisers create wakes that are magnified by the seawall.

USACE carefully considered the potential social impacts of the proposed Pointe Aux Chenes Reef before ultimately awarding a permit for the project (Appendix D). As part of the permitting process, the project goes through a public notification and comment period. The LCA submitted a formal letter indicating they had no objections to a spawning reef built at this site (See Appendix B). However, some residents of Russell Island had concerns. Russell Island is a small, private island in the St. Clair River. The island contains about 150 cottages and no cars and is only accessible via a passenger ferry or private boats. The Pointe Aux Chenes reef is located between the City of Algonac on Michigan mainland and Russell Island, 318 feet upstream from the Russell Island Ferry route (**Figure 15**). The ferry is run by the Russell Island Property Owners Association and operates in the spring, summer and fall months. Residents were concerned that reef rock placement or the resulting increased fishing activity could interfere with normal ferry operation.

Members of the reef project team met with residents on August 26, 2013, and prepared a formal response to their concerns. Figure 15 was prepared illustrating the exact distance between the reef edge and the ferry route (318 feet), which alleviated concerns that rock placement vessels would be in the way of the ferry. The reef project team also explained that fishing activity is unlikely to increase above the reef. The project is designed to support fish spawning, not attract fish and provide angler access. Most fish would migrate to the reef to spawn and leave a few days later. Angling for lake sturgeon is prohibited during their spawning season. Walleye are the only popular sport fish that are likely to use the reef and are regularly fished during spawning season. However, most walleye fishing happens in the early morning during the early spring, when boat and ferry traffic is minimal. Few people fish in this section of the North Channel during the summer because boat traffic is so heavy. For these reasons, the reef is unlikely to generate additional fishing activity that is significant or noticeable for the Russell Island ferry operators. Appendix B includes a letter to the USACE permitting office from Jim Felgenauer, resident angler and boater, explaining how fishing activity might be affected by the reef.

Figure 15. The Pointe Aux Chenes Reef in Relation to the Russell Island Ferry

3.3.3 Detroit River Reef Sites

The Detroit River reef locations would undergo the same level of planning, consultation and coordination as that described for the Harts Light and Pointe Aux Chenes reefs, including state and federal permitting, public notification and public comment. However, reefs at these locations are not currently funded through the USGS and project designs and permit applications have not been fully developed. The Detroit River is the second busiest navigation route in the Great Lakes. In 2007 (the last full year before the recession) commercial vessels transited the Detroit River approximately 5,800 times. Although specific reef coordinates have not been chosen for the Detroit River locations, the LCA reviewed Figures 12 through 14 as potential locations for spawning reefs. LCA indicated that both East Belle Isle and the Northeast Grassy Island locations pose no conflicts to commercial navigation interests (See Appendix B). Each location is close to, but definitely outside, the commercial navigation route.

The LCA identified issues with the proposed Fort Wayne reef, which was originally designed to be 4 acres and extend 550 feet offshore from the Historic Fort Wayne property. This site is located in a narrow section of the main stem of the Detroit River that is about 2,000 feet wide. The property along the shoreline contains a historic fort, city park facilities, federal offices and now mostly unused military housing. Although there are no commercial docks in the immediate vicinity of the proposed reef, freighters do regularly turn in this section of the Detroit River. Under circumstances of high wind speed and/or while turning upriver against the current, commercial freighters generate immense forces that are capable of scouring the river bed

In this area, turning ships are sometimes carried sideways down the river by the strong current. The LCA is concerned that rock placement or research vessels could congest the area and limit ship

maneuverability or that a commercial vessel could inadvertently destroy reef structures during turning manoeuvers. Further conversations with USACE permitting officials indicate that the USACE would support a proposal to build a narrow reef along the edge of the river, just offshore from the Fort Wayne property and safely away from freighters (**Figure 13**). Additional research is needed to ensure that conditions are optimal with this configuration. The Fort Wayne area is the largest area in the Detroit River with ideal water depth and velocity conditions for creating a fish spawning reef, and the reef project team would continue to monitor the site and explore options for establishing spawning habit. A spawning reef would only be developed at the Fort Wayne location if federal and state permitting agencies, important stakeholders such as LCA, and the project science team all support the plans. Figure 13 illustrates our best projection for how the reef footprint would be configured to minimize any of the concerns outlined here.

It's worth noting that in 2004, the reef project team constructed a pilot reef project (Belle Isle) right along the edge of a dredged navigation route in the Detroit River. The edge of one reef unit was just 21 feet from the navigation channel. The project was developed in consultation with the USACE and the selected contractor used precise rock placement methods to ensure no impact on navigation. Nearly 10 years later, the Belle Isle reefs remain intact, relatively free of sediment and attractive to native fish. The reefs have apparently suffered little impact from passing freighters and reef material has not shifted or impeded navigation.

3.3.4 Impacts for Communities

The project has no adverse effect on transportation, community services or neighborhoods.

The proposed spawning reef projects support the long-term vision of the state and federal agencies for the restoration of the ecological and economic ecosystems of the St. Clair River and Detroit rivers and for remediation of lost and degraded habitat. The project is part of a larger overall effort to eliminate Beneficial Use Impairments, within the Detroit River and St. Clair River Areas of Concern. The governing bodies for the St. Clair River Area of Concern recently revised their targets for removing these Beneficial Use Impairments. The recent report identifies spawning reef development as an integral part of their delisting targets (St. Clair BPAC 2012). The Detroit River Public Advisory Council is finalizing a revised delisting plan for fish and wildlife related Beneficial Use Impairments, and the plan would include spawning reef development at the three locations described here (Detroit River PAC 2013). Appendix A includes letters of support from the state agency that oversees the Great Lakes Area of Concern program.

In addition to anticipated long-term value to the fish communities of the St. Clair – Detroit River System and connected lakes, there would be improvement to associated sport fisheries, e.g. walleye, that would provide important, long-term socio-economic impacts. Long-term improvements to lake sturgeon populations resulting from this and other restoration activities in the System are expected to remove it from state threatened list and might ultimately support a sturgeon sport fishery with socio-economic and cultural values similar to the winter spearing activity now occurring in Lake Winnebago, Wisconsin.

In many communities along the river system, public officials and residents are realizing that their rivers and unique fish communities are an incredible asset to their communities and economies and should be protected, enhanced and promoted. Here are a few examples illustrating public interest in lake sturgeon restoration. In Clay Township, adjacent to the Pointe Aux Chenes Reef, efforts are underway to designate the town the Sturgeon Angling Capitol of Michigan, because this is one of the few places in the Great Lakes where sturgeon can be legally and reliably caught by recreational anglers. Michigan Out-of-

Doors (a popular statewide TV show) recently filmed an episode about lake sturgeon sport fishing in the St. Clair River. Port Huron, a town at the head of the St. Clair River, recently started an annual festival celebrating lake sturgeon, Sturgeon Fest, which was a big success during its inaugural year in 2013. Finally, after a recent Rotary event about sturgeon and spawning habitat remediation, a group of residents volunteered to form a sturgeon task force to address sturgeon poaching in collaboration with the local chapter of Sturgeon for Tomorrow. Recovery efforts for lake sturgeon, a large, unique and charismatic freshwater fish, could benefit the environment, as well as local communities. A healthy environment and outstanding recreation opportunities can elevate a region's reputation, attract talented people, businesses and visitors and ultimately contribute to an ecological and economic revitalization. See Appendix A for a letter from the president of the St. Clair – Detroit River Sturgeon for Tomorrow.

The No Action Alternative would hinder the progress of native fish recovery programs limiting the public's enjoyment and long-term socio-economic use of recreational fish.

3.4 Air Quality

This section summarizes existing air quality conditions and expected impacts on air quality associated with the proposed project. Air quality is evaluated as part of a regional network developed and maintained by the Southeast Michigan Council of Governments (SEMCOG). Updates to the air quality conformity have been completed for the 2040 Regional Transportation Plan to affirm that the emissions associated with the proposed project are well below the established 2002 baseline, and therefore, the project can be implemented with federal funding.

3.4.1 Attainment Status

The Air Quality Division of the MDEQ produces an Annual Air Quality Report, which outlines the attainment status of the state. According to the Michigan National Ambient Air Quality Standards Attainment Status produced by the MDEQ (2012), the project area is in attainment with the NAAQS for ambient concentrations of carbon monoxide (CO), Ozone (O_3), lead (Pb), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), fine particulate matter ($PM_{2.5}$) and coarse particulate matter (PM_{10}). Wayne and St. Clair counties meet these air quality standards and are in attainment for these pollutants including Ozone which was previously defined as nonattainment.

3.4.2 Regulatory Setting

Under the authority of the Clean Air Act and the 1990 Clean Air Act Amendments [42 U.S. Code (USC) 7401 *et seq*.], a set of primary and secondary Ambient Air Quality standards for six criteria pollutants was established. The primary standards are intended to protect the public health. Secondary standards are intended to protect public welfare and are based on a pollutant's effect on vegetation and other materials. The primary standards for each of the pollutants are shown in Table 2. Except for sulfur dioxide and carbon monoxide, the secondary standards are the same as the primary standards for all pollutants.

Table 2. Summary of Michigan Primary Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard
Particulate Matter, 10 micrometers (PM_{10})	24-hour	150 ug/m^3
Particulate Matter, ($PM_{2.5}$)	Annual Arithmetic Mean 98th percentile 24-hour averaged over 3 years	12 ug/m^3 35 ug/m^3
Sulfur Dioxide (SO_2)	99th percentile of 1-hour averaged over 3 years	0.075 ppm
Carbon Monoxide (CO)	2nd highest 8-hour 2ne highest 1-hour	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)
Ozone (O_3)	4th highest 8-hour/day max. averaged over 3 years	0.075 ppm (157 ug/m^3)
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm (100 ug/m^3)
Lead (Pb)	Maximum Rolling 3-Month Average	0.15 ug/m^3

Source: MDEQ, 2012

3.4.3 Impacts to Air Quality

Contractors specializing in marine construction on the St. Clair and Detroit Rivers would be hired through a competitive bidding process. Equipment would likely include a tugboat and a couple of barges with equipment for transporting and placing the rock, such as a crane or bottom dump hopper. Rock would be transported from a quarry to the reef site using a combination of trucks and barges, depending on the quarry location. Tugboats, equipment motors and trucks would likely run on diesel fuel and would produce some exhaust, creating small amounts of air pollution. The marine contractors that would bid on these projects work on a continuous basis within the river system and already meet the air quality requirements. No air quality mitigation measures are required for these specific projects. However, during reef rock placement the contractor must comply with all federal, state, and local laws and regulations governing the control of air pollution. Adequate control measures would be maintained so as not to cause detriment to the safety, health, welfare, or comfort of any person or cause any damage to any property or business, including minimizing potential short-term negative impacts which may be experienced locally due to the fugitive dust, vehicle exhaust, or other fumes related to materials and equipment. The No Action Alternative would not result in any addition effects on existing air quality.

3.5 Noise

The Federal Aid Highway Act of 1970 established the requirement that noise control be a part of the planning and design of all federally-aided roadways; Title 23: Part 772. On July 13, 2010, the Federal Highway Administration (FHWA) published a final rule updating 23 CFR 772 requiring each State Department of Transportation to revise its noise policy. The rule updated its guidelines for conducting noise studies and established noise abatement criteria for different land use activity categories. Noise impacts for the proposed project were evaluated in accordance with these new federal noise assessment guidelines. The project areas are 200 to 400 feet from shore, there are no structures or noise receptors within the project sites. Therefore, the project areas and land use has been determined to fall under FHWA's Noise Abatement Criteria Activity Category F and G. These land use categories are not considered sensitive to noise and include undeveloped land, agriculture and airports. Since the project

areas are Category F and G and there are no noise receptors at this time, a FHWA Traffic Noise Model is not required.

The impacts of noise created by the establishment of spawning reefs were considered as part of this EA. As with any construction project, areas around the site would likely experience short periods of noise impact while the projects are being established. Noise would be minimized by the use of mufflers on heavy equipment. Air compressors would meet federal noise level standards and would, if possible, be located away from residences or workers or shielded. Under normal circumstances, noisy activities are typically confined to the hours between 7:00 AM and 6:00 PM on weekdays. Therefore, critical time periods in which sleep or outdoor recreation would occur would not be subject to noise intrusion from the activities associated with establishing spawning reefs. All equipment employed to place rock would meet federal noise level standards because it would be deployed by contractors already in compliance with federal standards.

Noise during the development of the proposed projects would not exceed the NAC Category F and G receptors under the preferred alternative. No noise abatement measures are required. The No Action Alternative would not result in any addition effects on existing noise.

3.6 Summary of Water Resources

The USACE has the authority to regulate activities within the waters of the U.S. under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344). Rivers in Michigan are regulated in part under Part 301 and Part 325 of Michigan's Natural Resources and Environmental Protection Act, Public Act 451. Data obtained for total Hg, Cd, Cr, Cu, Ni, Pb and Zn were compared with applicable Rule 57 water quality values. These values were developed in accordance with the Part 4 Michigan Water Quality Standards promulgated pursuant to Part 31 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

3.6.1 Water Quality

While parts of the river system exceed standards, as detailed below, the proposed work would be conducted in areas where there are no fine sediments with associated pollutants. It is possible that human error during reef rock placement may lead to a small scale, short-term spill but it is anticipated that contractors employing best management practices would contain these spills. Therefore we anticipate no long-term adverse impacts to water quality as a result of the project.

Conventional parameters (e.g. temperature, pH, dissolved oxygen) measured in the St. Clair and Detroit Rivers are in a range sufficient to sustain aquatic life, pursuant to Michigan Water Quality Standards (WQS), Ontario Provincial Water Quality (PWQ) Objectives, and Great Lakes Water Quality Agreement (GLWQA) Objectives. However, some nonconventional parameters (e.g. metals and PCBs) have been found to exceed one or several of Michigan WQS Rule 57(2) levels, Ontario PWQ Objectives, or GLWQA Specific Objectives and potentially impair one or more of the designated beneficial uses of the river. Conventional water quality data collected in 2005 from the upstream and downstream stations in the St. Clair and Detroit rivers are briefly summarized (2005-MI/DEQ/WB-07/066) below.

- Mean total chloride concentrations at the St. Clair and Detroit rivers are slightly higher than the quantification limit (QL) of 1 mg/L, ranging from 6 to 9 mg/L.

- Mean TKN, nitrate and phosphorus concentrations were relatively low in the St. Clair and Detroit Rivers, ranging from 0.14 to 0.26 mg/L for TKN (QL = 0.10 mg/L), 0.30 to 0.35 mg/L for nitrate (QL = 0.010 mg/L) and 0.007 to 0.025 mg/L for phosphorus (QL = 0.005 mg/L).

- Mean TSS concentrations were quite low at the St. Clair River upstream station (1 mg/L). Those measured at the St. Clair River downstream station and the Detroit River ranged from 6 to 12 mg/L (QL = 4 mg/L).

- At all locations, mean total Cd concentrations, and in fact nearly all individual Cd concentrations, were below the QL for Cd (0.037 ug/L).

- Mean total Cr concentrations were relatively low at all locations, ranging from 0.044 to 0.45 ug/L (QL = 0.19 ug/L).

- Mean total Cu, Pb and Zn concentrations were lowest at the St. Clair River upstream station (0.53 ug/L, 0.028 ug/L and 0.83 ug/L, respectively) and highest at the Detroit River downstream station (1.1 ug/L, 0.49 ug/L and 2.6 ug/L, respectively). (Copper QL = 0.1 ug/L; lead QL = 0.014 ug/L; zinc QL = 0.43 ug/L).

- Mean total Ni concentrations were lowest at the St. Clair River upstream station (0.38 ug/L) and highest at the Detroit River downstream station (1.4 ug/L). (QL = 0.31 ug/L).

- Mean total Hg concentrations at all St. Clair River monitoring stations were quite low (0.36 to 0.48 ng/L), whereas those at the Detroit River were relatively high (2.4 ng/L and 2.6 ng/L at the upstream and downstream stations, respectively). (QL = 0.45 ng/L).

Analytical results obtained for Cd, Cr, Cu, Pb, Ni, Hg and Zn compared with applicable Rule 57, met applicable Rule 57 water quality values. Total Hg exceeded the Hg Rule 57 water quality value of 1.3 ng/L in 12 of 42 samples analyzed in 2005. With the exception of one sample collected at the upstream station in the St. Clair River in April 2005 all samples exceeding the Hg Rule 57 water quality value were collected from the Detroit River.

All of the proposed sites for fish habitat remediation consist of hard-pan clay river bottom, 200 to 400 feet offshore. Because of the high flow within the water column over hard-pan clay, this bottomland does not act as a trap for fine sediments often associated with organic contaminated stormwater discharge. Therefore, placement of the limestone reef material upon the hard-pan clay does not cause re-suspension of fine contaminated sediment that would degrade water quality. In addition, the engineered 4 to 8 inch angular limestone used to construct the reefs is clean, inert, natural material and would not contribute to degradation of the water quality.

Minor short-term impacts to water quality may occur during reef rock placement activities from accidental discharges; however, the marine contractors are experienced and maintain spill clean-up protocols. There would be no long-term impacts to water quality as a result of the proposed activity. The No Action Alternative would not result in any addition effects on existing water quality.

3.6.2 Surface Hydrology

The St. Clair and Detroit rivers are wide, deep and fast flowing rivers. The mean flow for the year 2005 on the St. Clair River was 88 billion gallons per day (4,624 m^3/sec) and for the Detroit River 96 billion gallons per day (5,070 m3/sec) (MDEQ 2007). A hydrologic and hydraulic analysis was performed for the

potential impact of the proposed reef in the St. Clair River near Pointe aux Chenes and Fort Wayne in the Detroit River by SmithGroupJJR engineers. Based on the proposed development of spawning reefs, 250 feet wide and 2 feet high, the cross sectional area would be 500 square feet. Based on these dimensions, the cross sectional area of the reef would take up much less than 1% of the river cross section. The stone structure proposed on the St. Clair River and the Detroit River bottomland for the creation of improved fish habitat are designed to pass all intermediate flood levels up to an including the 100-year flood without causing a harmful interference such as an increased flood stage or significant change in direction of flow.

There would be no impact to river hydraulics as a result of the proposed actions that would cause damage to property; a threat to life; a threat to personal injury; pollution; or, destruction of water or other natural resources. In addition to permits from the USACE and the MDEQ, the reef project team must consult with the U.S. Department of State for a review of any potential impacts on water conveyances through the connecting channels per the U.S.-Canada Boundary Waters Treaty of 1909. Three of the proposed reef projects (Pointe Aux Chenes, Harts Light and Fort Wayne) have already been reviewed and approved by the U.S. Department of State, as discussed in Section 4.2: Agency Coordination. The No Action Alternative would not alter existing hydrology. Because the proposed activities are not controlling or modifying the hydrology of the rivers in any detectable way, the project team determined that it was not necessary to conduct a formal consultation regarding hydrological impacts for fish and wildlife service, which sometimes occurs under the Fish and Wildlife Coordination Act.

3.7 Federal Threatened and Endangered Species

Project partners communicated with biologists from the East Lansing USFWS field office, which is responsible for Section 7 consultation and compliance under the Endangered Species Act of 1973. After discussing the proposed projects, Tameka Dandridge instructed the team to complete an e-consultation process using their detailed guidance and database available online)http://www.fws.gov/midwest/Endangered/). Their office no longer provides customized concurrence letters in cases where “no effect” is expected for federally listed species. Email correspondence summarizing a phone conversation is provided in Appendix F.

As instructed by FWS, we used the USFWS website (http://www.fws.gov/midwest/Endangered/) to generate a list of threatened and endangered species specific to St. Clair and Wayne Counties that may be present in the St. Clair – Detroit River System (Table 3). Based on this list, the only endangered species identified that could potentially exist within any of the river bottom project sites is the Northern riffleshell *(Dysnomia torulosa rangiana)* and Rayed Bean Mussel *(Villosa fabalis)*. In review of the criteria identified under the USFWS website, the Northern riffleshell and Rayed Bean would not be present at the proposed sites because the bottomland of the designated project area is hard-pan clay without sand/gravel beds or rocks which are the preferred habitat of this species and the Rayed Bean is more common to smaller, headwater creeks and waved-washed areas of glacial lakes. (See Appendix F for fact sheets on both species). Thus the project sites do not provide suitable habitat for the Northern riffleshell. Indeed, field investigations including divers’ observations and/or video record of all of the proposed locations did not find any evidence of live or dead Northern riffleshells. Therefore based on the procedures for E-consultation on the USFWS website and field observations, we conclude that the Preferred Alternative and the No Action Alternative would have no effect on Northern riffleshell and Rayed Bean or, because there are no other associated federal threatened or endangered species present, any other species. The E-consultation process generated a letter with this conclusion, which is provided in Appendix F.

Table 3. Federal List of Threatened and Endangered Species

County	Species	Status	Potential Occurrence
St. Clair	Indiana Bat *(Myotis sodalis)*	Endangered	No
	Northern long-eared bat *(Myotis septentrionalis)*	Proposed as Endangered	No
	Rufa Red knot *(Calidris canutus rufa)*	Proposed Threatened	No
	Rayed bean *(Villosa fabalis)*	**Endangered**	**Yes**
	Snuffbox *(Epioblasma triquetra)*	Endangered	No
	Eastern prairie fringed orchid *(Planthathera leucophaea)*	Threatened	No
Wayne	Indiana Bat *(Myotis sodalis)*	Endangered	No
	Northern long-eared bat *(Myotis septentrionalis)*	Proposed as Endangered	No
	Rufa Red knot *(Calidris canutus rufa)*	Proposed Threatened	No
	Eastern massasauga *(Sistrurus catenatus)*	Candidate	No
	Northern riffleshell *(Epioblasma torulosa rangiana)*	**Endangered**	**Yes**
	Rayed bean *(Villosa fabalis)*	**Endangered**	**Yes**
	Eastern prairie fringed orchid *(Planthathera leucophaea)*	Threatened	No

Source: USFWS, http://www.fws.gov/midwest/Endangered/

3.8 State Threatened and Endangered Species

After reviewing the draft EA in April of 2014, the USEPA recommended that USGS initiate a line of communication and discuss the potential for consultation (including the potential for a Rare Species Review) with the Michigan Natural Features Inventory. The Rare Species Review corresponds to the Endangered Species Assessment previously provided by the Wildlife Division of the Michigan Department of Natural Resources (MDNR), as MDNR ceased to accept review requests to the Environmental Review (ER) Program after September 16,2011.

In May of 2014, the project team contacted with MDNR Wildlife Division (Lori Sargent) and the Michigan State University Extension – Michigan Natural Features Inventory (MNFI) to discuss potential impacts to relevant state listed threatened and endangered species. MNFI responded on June 4, 2014 with their rare species review for each of the five sites (See Appendix F). Each of the five proposed project sites was checked against known localities for rare species and unique natural features, which are recorded in the MNFI natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. Table 4 provides a list of legally protected and special concern species that have been documented within 1.5 miles of the proposed remediation sites, based on MNFI's rare species review conducted by Michael Sanders using the MNFI database.

Table 4. State List of Threatened, Endangered and Special Concern Species within 1.5 miles of a Project Site

Site	Species	Taxa	Status	Potential Occurrence
Harts Light Reef (St. Clair River)	**Northern madtom *(Noturus stigmosus)***	**Fish**	**Endangered**	**Yes**
	Sullivants milkweed *(Asclepias sullivantii)*	Plant	Threatened	No
	Peregrine falcon *(Falco peregrinus)*	Bird	Endangered	No
	White gentian *(Gentiana flavida)*	Plant	Endangered	No
Pointe Aux Chenes Reef (St. Clair River)	Yellow-fringed orchid (*Platanthera cillaris)*	Plant	Endangered	No
	Spearwort *(Ranunculus ambigens)*	Plant	Threatened	No
	Three-awned grass *(Aristida longespica)*	Plant	Threatened	No
	Snuffbox *(Epioblasma triquetra)*	Mussel	Endangered	No
	Prairie buttercup *(Ranunculus rhomboideus)*	Plant	Threatened	No
	Few-flowered nut rush *(Scleria pauciflora)*	Plant	Endangered	No
	Lake sturgeon *(Acipenser fulvescens)*	**Fish**	**Threatened**	**Yes**
	Eastern fox snake *(Pantherophis gloydi)*	Snake	Threatened	No
	Eastern pondmussel *(Ligumia nasuta)*	**Mussel**	**Endangered**	**Yes**
	Spotted turtle *(Clemmys guttata)*	Turtle	Threatened	No
	Cross-leaved milkwort *(Polygala cruciata)*	Plant	Special Concern	No
	Pink milkwort *(Polygala incarnata)*	Plant	Apparently Extirpated	No
	White false indigo *(Baptisia lactea)*	Plant	Special Concern	No
	Fescue sedge *(Carex festucacea)*	Plant	Special Concern	No
	Chestnut sedge *(Fimbristylis puberula)*	Plant	Apparently Extirpated	No
	Hills Thistle *(Crisium hillii)*	Plant	Special Concern	No
	Sand Grass *(Triplasis purpurea)*	Plant	Special Concern	No
	Tall nut rush *(Scleria triglomerata)*	Plant	Special Concern	No
	Campeloma spire snail *(Cincinnatia cincinnatiensis)*	Snail	Special Concern	No
East Belle Isle Reef (Detroit River)	**Northern riffleshell (*Epioblasma torulosa rangiana*)**	**Mussel**	**Endangered**	**Yes**
	Purple wartyback (*Cyclonaias tuberculata*)	**Mussel**	**Threatened**	**Yes**
	Forster's tern (*Sterna forsteri*)	Bird	Threatened	No
	Common tern (*Sterna hirundo*)	Bird	Threatened	No
	River redhorse (*Moxostoma carinatum*)	**Fish**	**Threatened**	**Yes**
	Channel darter (*Percina copelandi*)	**Fish**	**Endangered**	**Yes**
	Wavyrayed lampmussel (*Lampsilis fasciola)*	Mussel	Threatened	No
	Sullivants milkweed (*Asclepias sullivantii*)	Plant	Threatened	No
	White catspaw (*Epioblasma obliquata perobliqua*)	Mussel	Endangered	No

Site	Species	Taxa	Status	Potential Occurrence
	Wild rice (*Zizania aquatica var. aquatica*)	Plant	Threatened	No
	Salamander mussel (*Simpsonaias ambigua*)	**Mussel**	**Endangered**	**Yes**
	Hickorynut (*Obovaria olivaria*)	**Mussel**	**Endangered**	**Yes**
	Peregrine falcon (*Falco peregrinus*)	Bird	Endangered	No
	Lake sturgeon (*Acipenser fulvescens*)	**Fish**	**Threatened**	**Yes**
	Eastern Pondmussel (*Ligumia nasuta*)	**Mussel**	**Endangered**	**Yes**
	Rayed bean (*Villosa fabalis*)	**Mussel**	**Endangered**	**Yes**
	Threehorn wartyback (*Obliquaria reflexa*)	**Mussel**	**Endangered**	**Yes**
	Snuffbox (*Epioblasma triquetra*)	Mussel	Endangered	No
	Round hickorynut (*Obovaria subrotunda*)	**Mussel**	**Endangered**	**Yes**
	Slippershell (*Alasmidonta viridis*)	Mussel	Threatened	No
	Sauger (*Sander canadensis*)	**Fish**	**Threatened**	**Yes**
	Northern madtom (*Noturus stigmosus*)	**Fish**	**Endangered**	**Yes**
	Fawnsfoot (*Truncilla donaciformis*)	**Mussel**	**Threatened**	**Yes**
	Tinted spurge (*Euphorbia commutata*)	Plant	Threatened	No
East Belle Isle Reef (Detroit River)	Virginia snakeroot (*Aristolochia serpentaria*)	Plant	Threatened	No
	Woodland lettuce (*Lactuca floridana*)	Plant	Threatened	No
	Pumpkin ash (*fraxinus profunda*)	Plant	Threatened	No
	Tall nut rush (*Scleria triglomerata*)	Plant	Special Concern	No
	Winged monkey flower (*Mimulus alatus*)	Plant	Apparently Extirpated	No
	Round pigtoe (*Pleurobema sintoxia*)	**Mussel**	**Special Concern**	**Yes**
	Field chickweed (*Cerastium velutinum*)	Plant	Apparently Extirpated	No
	Deertoe (*Truncilla truncata*)	**Mussel**	**Special Concern**	**Yes**
	Silver chub (*Macrhybopsis storeriana*)	**Fish**	**Special Concern**	**Yes**
	Kidney shell (*Ptychobranchus fasciolaris*)	**Mussel**	**Special Concern**	**Yes**
	A fingernail clam (*Pisidium simplex*)	Mussel	Special concern	No
	Rainbow mussel (*Villosa iris*)	Mussel	Special Concern	No
	Greater european pea clam (*Pisidium amnicum*)	**Mussel**	**Special Concern**	**Yes**
	Proud globelet (*Mesodon pennsylvanicus*)	Snail	Special Concern	No
	Shumard's Oak (*Quercus shumardii*)	Plant	Special Concern	No
	Blue-eyed-grass (*Sisyrinchium hastile*)	Plant	Apparently Extirpated	No
	Trailing wild bean (*Strophostyles helvula*)	Plant	Special Concern	No
	Smooth carrion-flower (*Smilax herbacea*)	Plant	Special Concern	No

Site	Species	Taxa	Status	Potential Occurrence
Fort Wayne Reef (Detroit River	Wild rice (*Zizania aquatica var. aquatica*)	Plant	Threatened	No
	Eastern fox snake (*Pantherophis gloydi*)	Snake	Threatened	No
	Purple wartyback (*Cyclonaias tuberculata*)	**Mussel**	**Threatened**	**Yes**
	Northern riffleshell (*Epioblasma torulosa rangiana*)	**Mussel**	**Endangered**	**Yes**
	Hickorynut (*Obovaria olivaria*)	**Mussel**	**Endangered**	**Yes**
	Lilliput (Toxolasma parvus)	**Mussel**	**Endangered**	**Yes**
	Tall nut rush (*Scleria triglomerata*)	Plant	Special Concern	No
	Round pigtoe (*Pleurobema sintoxia*)	**Mussel**	**Special Concern**	**Yes**
	Field chickweed (*Cerastium velutinum*)	Plant	Apparently Extirpated	No
	Rainbow mussel (*Villosa iris*)	Mussel	Special Concern	No
Northeast Grassy Island Reef (Detroit River)	**Lake sturgeon (*Acipenser fulvescens*)**	**Fish**	**Threatened**	**Yes**
	Common tern (*Sterna hirundo*)	Bird	Threatened	No
	Spotted turtle (*Clemmys guttata*)	Turtle	Threatened	No
	Wild rice (*Zizania aquatica var. aquatica*)	Plant	Threatened	No
	Northern riffleshell (*Epioblasma torulosa rangiana*)	**Mussel**	**Endangered**	**Yes**
	Eastern pondmussel (*Ligumia nasuta*)	**Mussel**	**Endangered**	**Yes**
	Hickorynut (*Obovaria olivaria*)	**Mussel**	**Endangered**	**Yes**
	Round hickorynut (*Obovaria subrotunda*)	**Mussel**	**Endangered**	**Yes**
	Purple wartyback (*Cyclonaias tuberculata*)	**Mussel**	**Threatened**	**Yes**
	Black sandshell (*Ligumia recta*)	**Mussel**	**Endangered**	**Yes**
	Slippershell mussel (*Alasmidonta viridis*)	Mussel	Threatened	No
	Silver chub (*Macrhybopsis storeriana*)	**Fish**	**Special Concern**	**Yes**
	Kidney shell (Ptychobranchus fasciolaris)	**Mussel**	**Special Concern**	**Yes**
	Round pigtoe (Pleurobema sintoxia)	**Mussel**	**Special Concern**	**Yes**
	Rainbow mussel (*Villosa iris*)	Mussel	Special Concern	No

Source: Michigan Natural Features Inventory Rare Species Review and Website

Based on this extensive list of species that occur within 1.5 miles of a project location, only a select group of legally protected mussels and several fish species have the potential to exist in the deep water of one or more of the specific project sites. Species known to occur on the river bottom of large (5^{th} and 6^{th} order) rivers like the St. Clair and Detroit Rivers, and therefore could occur in the project sites, are listed in bold font and indicated in the last column. However, MNFI concluded within their correspondence that, "it seems the necessary measures have been taken to avoid impacting rare native mussels and fish species. In fact, rare fish species may benefit from these artificial reefs. Therefore, it is not likely that negative impacts will occur."

Further investigation of habitat criteria for state listed species and field investigations by the project team lead us to believe that the identified mussel species do not exist at the site. Most of these mussels prefer

gravel substrates or highly organic substrates, and would not thrive in the hard pan clay bottomlands selected as potential remediation sites. It is assumed that if present, fish species are mobile and will relocate during the placement of spawning reef rock material. It is also anticipated that the listed fish species will benefit overall once the proposed spawning reefs are completed. In particular, the proposed projects have been designed to support spawning by lake sturgeon and other broadcast spawners that utilize rocky areas. In addition, northern madtom have been observed on completed reef projects and are expected to use the proposed reefs and benefit from the remediation. Therefore, based on the presented information and the opinion of MNFI, we conclude that the Preferred Alternative and the No Action Alternative would have no negative effect on any of the listed species.

3.9 Invasive Species

Several invasive species have the potential to colonize the artificial reef: the round goby (*Neogobius melanostomus*) and sea lamprey (*Petromyzon marinus*), and two closely related invasive mussels, the zebra mussel (*Dreissena polymorpha*) and quagga mussel (*Dreissena rostriformis bugensis)*. However, the proposed spawning reefs are not expected to appreciably benefit these already abundant and wide spread invasive species.

3.9.1 Round Goby

The round goby is a small, bottom-dwelling fish native to Eurasia that was discovered in the St. Clair River in 1990 and quickly spread to many parts of the Great Lakes. The round goby reproduces quickly, competes with native fish such as sculpin, and survives well in a wide range of water conditions. Goby deposit their eggs in large rock crevices and male fish guard the eggs until the larvae emerge. Round gobies eat a variety of invertebrates, including invasive mussels, as well as fish eggs and larvae of important native sport and commercial fish. Interestingly, the abundance of round gobies in the central Great Lakes has provided some benefits: the fish reduce the numbers of invasive mussels and they have become a regular part of the diet for many sport fish including walleye, lake sturgeon, smallmouth bass (*Micropterus dolomieu*), and lake trout (*Salvelinus namaycush*).

Round gobies are already abundant throughout the St. Clair – Detroit River System and would likely colonize the proposed artificial spawning reefs to some extent. However, past reef creation projects indicate that round gobies preferentially colonize larger rock sizes where they spawn in the large spaces between rocks. The proposed reef material, 4 to 8 inch broken limestone, is believed to be minimally attractive as a nesting site for round gobies and the projects are unlikely to have a detectable effect on goby populations. Past projects found that a wide range of small and large fish colonized and spawned on the artificial reefs, including some round goby, indicating that the presence and predation effects of round gobies did not prevent native fish from using the reef successfully as spawning and nursery habitat while the eggs and fry developed.

3.9.2 Sea Lamprey

The sea lamprey is a parasitic invasive species that was introduced to Lakes Erie, Huron and Michigan through the shipping canals in the early 1900s. As adults, this primitive, eel-like fish attaches itself to other fish and feeds on the blood and body fluids of host fish such as salmon, walleye and lake sturgeon, killing smaller fish and reducing the fitness of larger fish. For this reason, the sea lamprey is considered to be a destructive pest and several million dollars are spent annually to control lamprey populations in the Great Lakes basin. Sea lamprey migrate to rivers to spawn and typically spend the first couple years of their life filter feeding in smaller Great Lakes tributaries before transforming into parasitic adult fish and

migrating back to the Great Lakes. Lamprey spawning habits are well studied because their spawning and rearing grounds are the focus of control efforts. Sea lamprey form nests in gravel substrate in small and large tributaries of the Great Lakes. Most studies indicate they are unable to manipulate the substrate and form nests with rocks larger than 1 to 1.5 inches (Applegate 1950; Wigley 1959). A selective poison, TFM or granular Bayluscide, is added to known lamprey spawning and nursery areas in 175 tributaries around the Great Lakes to eliminate or reduce populations of lamprey larvae (GLFC Sea Lamprey Control Program).

There is some evidence of lamprey spawning in the St. Clair River and its tributaries, and several sites are treated regularly with lampricide (GLFC Sea Lamprey Control Program). Reports of parasitic sea lampreys attached to fish in Lake St. Clair are rare, suggesting that survival of juvenile sea lampreys from the St. Clair River and recruitment to the parasitic population in Lake Erie are minimal. There is no evidence of lamprey spawning in the Detroit River; however, improvements in habitat and water quality could improve the survival of larval and juvenile lamprey either passing through or produced in the St. Clair – Detroit River System. In recent years, the number of sea lamprey in Lake Erie has risen and treatment of all streams known to produce larval sea lampreys has not reduced the lamprey wounding rates observed in Lake Erie (Jubar and Neave 2013). As a result, some scientists believe the St. Clair – Detroit River System could be a source of sea lamprey to Lake Erie and have mounted an intense monitoring effort in the Corridor in 2011 and 2012. Four juvenile sea lamprey (transformers) were captured during 2,462 hours of fyke netting in 2011 and 18 juvenile sea lampreys were collected during the nearly 9,900 hours of trapping effort put forth by USFWS field crews. However, two of the juvenile lamprey caught in the Detroit River had coded wire tags indicating that migration through Lake St. Clair, and potentially into Lake Erie, is possible (Hrodey et al. 2013). However the number of lamprey coming from the river system and contributing to parasitic lamprey populations in Lake Erie is still being investigated.

Project partners have worked with federal and provincial sea lamprey biologists, many of whom are in the same federal agencies as reef project team members (e.g., USFWS). Representatives from the Sea Lamprey Control Program participate in Huron-Erie Corridor Initiative Annual Meetings. The reef team has worked to minimize concerns associated with this invasive species and have adjusted the size range of reef material from 2 to 8 inch to 4 to 8 inch limestone to ensure that it is well above the size range known to be used for sea lamprey nests. Egg deposition measurements on past artificial reef projects in the St. Clair – Detroit River System have not detected any sea lamprey eggs, and larval drift nets have not caught any larval or juvenile lamprey. Scuba divers and underwater camera surveys have never observed lamprey nests on or in the vicinity of completed reef projects. Based on this information, the project team concludes that the proposed reef projects would not favor sea lamprey spawning or overall populations of sea lamprey in the river system or Great Lakes basin. Reef project team members would continue to monitor the reefs for use by native and invasive fish, including sea lamprey.

3.9.3 Invasive Mussels

The zebra mussel was first observed in Lake St. Clair in 1985 and the quagga mussel appeared a few years later. Both freshwater mussels are small, filter feeders that have spread quickly throughout the Great Lakes, altering water clarity and food web structure. The zebra mussel primarily colonizes shallow water (< 30m) with hard substrates, while the quagga mussel is able to colonize both stable soft and rocky substrates to depths of more than 100m. The numbers of mussels have fluctuated dramatically over the past 30 years and currently the quagga mussel is the dominant invasive mussel in Lakes Huron and Erie, particularly in deep waters with soft sediments. Both mussels filter large volumes of water, extracting phytoplankton and small zooplankton and concentrating energy and biological activity in the

benthic environment. In recent years, many native fish have been observed eating the mussels, although the mussels are believed to be less nutritious than native benthic invertebrates. In lake systems, the colonization of mussels has improved water clarity and light penetration, allowing benthic algae to grow in deeper waters. This has not been shown to occur within river systems like the St. Clair – Detroit River System due to the constant influx of suspended sediment within the water column. The proposed reef projects are located in waters that are at least 25 feet deep and well below the photic zone where filamentous benthic algae can flourish.

Zebra and quagga mussels are well established and common throughout the St. Clair – Detroit River system, and are expected to colonize the new reef material to some degree. However, observations of existing reef projects indicate that colonization of the reef beds is no greater than colonization of the natural surrounding substrates. High numbers of invasive mussels have not been observed on the three completed reef projects, one of which has been in place for nearly ten years. Although silt and encrusting algae and invertebrates are generally thought to make the reefs less attractive to spawning fish, past reef projects illustrated that suckers and other fish graze and effectively clean the reefs seasonally as part of their spawning activity. For these reasons, the project team does not anticipate that the proposed artificial reefs would support large number of invasive mussels, and the few mussels that do colonize on or near the reefs are unlikely to have a detrimental effect on reef performance or the ecology of the river system.

3.10 Section 4(f)

No Section 4(f) properties are identified in the project area, including publicly owned parks, recreational areas, wildlife and waterfowl refuges.

3.11 Tribal Consultation

There are no tribal groups located in the immediate watershed of the St. Clair or Detroit Rivers; however, there are a few First Nations on the Canadian side of these rivers. The Huron-Erie Corridor Initiative (discussed in Section 1.2.5 and Section 4.2) regularly engages First Nations from Canada that have some management jurisdiction within the Corridor. Representatives from the Walpole Island First Nation and the Aamjiwnaang First Nation (also known as the Chippewas of Sarnia) regularly come to HEC initiative annual meetings and public events about our completed reef projects. They have had the opportunity to learn about the proposed spawning reef projects through these meetings and events.

Several Tribal groups and First Nations were sent a notice about this EA and the proposed work, including:

- The United Tribes of Michigan (Frank Ettawageshik), a group that provides coordination for Michigan tribal groups.
- The Aamjiwnaang First Nation (Sharilyn Johnston) from the Canadian side of the corridor.
- The Walpole Island First Nation (Kennon Johnson, Dean Jacobs and Jared McBeth) from the Canadian side of the corridor.

To date, the response from Tribal and First Nation representatives to the proposed work has been positive, in fact the Aamjiwnaang First Nation suggested providing additional funding for the proposed work as compensation for anticipated fishery impacts elsewhere. Appendix B includes a letter from the Aamjiwnaang First Nation in support of a very similar fish spawning reef project occurring in the Canadian waters of the Detroit River. The design and assessment of the Fighting Island project mentioned in the

letter was supported by scientists involved in the projects described in this EA. As the Aamjiwnaang letter indicates, sturgeon are an important part of First Nation people's heritage and culture. Sturgeon were used for food and medicinal purposes and the bones were fashioned into needles, spears and arrowheads. Traditionally, sturgeon spawning events were an opportunity to gather, celebrate and teach.
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3.12 Historic, Architecture, Archeology, and Cultural Resources

In accordance with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended, the reef project team coordinated with the State Historic Preservation Office (SHPO) to determine the presence of any potential impacts to historic, archeological and cultural resources within the Area of Potential Effects (Appendix C). Section 106 requires that federal agencies take into account the effects their projects may have on historic properties listed in or eligible for listing in the National Register of Historic Places. Appendix C includes the concurrence letter provided by SHPO after their recent review of the St. Clair and Detroit River project plans.

The proposed project would cover small areas of the St. Clair and Detroit River bottomland to establish native fish spawning habitat, utilizing 4 to 8 inch angular limestone. Reef rock would be placed using a crane mounted on a floating barge or a bottom dump barge. There would be no excavation of the river bottomland. Stone would be placed directly on the existing hard-pan substrate using a clamshell bucket or dropped through the bottom of the barge. Any potential archaeological or cultural artifacts on the river bottom would be identified through the reef project team's reef siting and pre-remediation assessment protocols. USGS Great Lakes Science Center scientists have investigated the proposed reef areas using side scan sonar transects nearly 0.5 miles above to 0.5 miles below the proposed reef site, with further validation using underwater drift cameras as needed. Based on the imagery from the sonar transects any structures or debris identified were avoided when selecting reef coordinates. At some locations in the St. Clair River, there are parts of old docks and boat houses that tumbled into the water and attract fish. These debris fields were avoided when selecting reef coordinates. The imagery showed primarily hard-pan substrate with scattered patches of gravel and/or invasive mussels. Other than the observations of invasive mussels and an occasional adult fish passing though the field of view, no other biological activity or organisms were observed. Additional detailed surveys (sonar, underwater video and scuba) would be conducted during the spring – early summer 2014, when conditions are favorable for assessment.

3.13 Indirect and Cumulative Impacts

3.13.1 Indirect Impacts

There could be localized, short-term impacts resulting from the proposed reef projects, if additional spawning or nursery habitat is created for invasive species (See Section 3.8: Invasive Species), or if the reefs reduce water depths in a section of the river used by commercial vessels (See Section 3.3: Social Impacts). As described elsewhere, through on-going consultation with the Sea Lamprey Control Program and other invasive species specialists, the reef project team has concluded that the rock material selected provides the most benefit to native species, while minimizing the colonization by invasive species. The diameter of chosen reef material, 4 to 8 inch limestone, is far larger than the gravel beds used by sea lamprey. Similarly, we are confident that we have selected sites that would minimize potential impact on or from commercial navigation. Iterative conversations with the Lake Carriers Association have enabled the reef project team to choose locations that because of the water depth and distance from navigation routes present minimal or no potential impact to commercial navigation. Even under climate change and fluctuating water level scenarios the proposed reef sites would not interfere or be impacted by freighters.

The only additional impact could result during reef project establishment if shoreline residents or boaters find the barges unsightly or inconvenient. As discussed in Section 4.3: Public Involvement, consultation with riparian landowners, ferry operators, public officials and residents have allowed the reef project team to choose locations and work time periods that should minimize any impacts. Appendix E includes letters of support from communities adjacent to the proposed projects.

3.13.2 Cumulative Impacts

The Cumulative impacts would be overwhelmingly positive as demonstrated in the following research summaries from the USGS Great Lakes Science Center of spawning reefs constructed between 2004 and 2012 (See Table 1 for reef project specifications).

- **Belle Isle Reefs:** The reef project team documented limnological and biological conditions, including fish use of the Belle Isle Reef area, for two years before and two years after development of the three pilot reef beds in spring 2004. Prior to reef development, the study area was little used by fish and few spawning ready adults or fish eggs were collected. After reef establishment, 14 species of native fish were found to spawn on the reef, based on collections of adult spawning-ready fish or eggs deposited on egg mats and hatched and identified in the lab. Native fish using the reef included: lake whitefish, northern pike, emerald shiner, quillback, white sucker, northern hog sucker, silver redhorse, shorthead redhorse, trout-perch, white bass, rock bass, yellow perch and walleye. Two invasive species also used the reefs: white perch and round gobies. One spawning ready lake sturgeon was caught on the reef, but the reef project team has not, to date, been able to document sturgeon spawning on the reef (Manny 2006).

- **Fighting Island Reefs:** Preliminary assessments found that only walleye and lake whitefish spawned in the area; 11 species of adult fish were collected during the first spawning season after reef development, including increased abundance of northern madtom and the first documented spawning event by lake sturgeon on a man-made reef in the river. During most of the years after reef development, the reef project team has collected spawning-ready adult lake sturgeon, viable lake sturgeon eggs and lake sturgeon larvae on the reef. The team also found adults and eggs of walleye, various sucker species and lake whitefish on the constructed reefs (Roseman et al. 2011, Bouckaert 2013, Manny et al., in review).

- **Middle Channel Reefs:** To date, the reef project team has conducted one year of assessment after establishing a spawning reef in the Middle Channel of the St. Clair River. Scuba divers and egg mats documented spawning-ready lake sturgeon and lake sturgeon eggs on the reef during and immediately after reef development (**Figure 16)**. Average baseline egg density (all species combined) was 3.5 eggs per square meter, after reef establishment, egg density ranged from 4 to 151 eggs per square meter across the reef beds. There appear to be higher numbers of walleye and white suckers in the area after reef development. Additional years of study would be required to document the impacts of this reef on juvenile and adult fish populations (Lynch 2013, Bouckaert 2013)

Figure 16. Underwater Images of Lake Sturgeon and Sturgeon Eggs

Middle Channel Reef shortly after reef rock was placed in 2012

Historically, the northern madtom was found in several large rivers of southeastern Michigan and southwestern Ontario, and along the eastern shore of Lake St. Clair (Carman 2001). However, records of this species have been few since the mid-1970s (Goodchild 1993, Latta 2005), and it is currently listed as endangered and critically impaired by the State of Michigan, Province of Ontario, and the government of Canada (Latta 2005). Post-remediation assessment data associated with both the Belle Isle and Fighting Island Reef projects show an increase in the catch per effort of this globally rare species, suggesting northern madtom are using the reefs to fulfill life history requirements (Manny et al., in review).

The lake sturgeon is a threatened fish species in the State of Michigan and Province of Ontario. Efforts are underway to restore the lake sturgeon population in the Detroit River. Lake sturgeon spawning was documented for multiple years at the Fighting Island and Middle Channel reef projects. Scientists hypothesize that the immediate use of the created reef beds for successful reproduction indicates that restoration of lake sturgeon populations in the St. Clair – Detroit River System is likely limited by suitable reproductive habitat.

In addition to northern madtom and lake sturgeon, the spawning reef would provide spawning habitat for a number of other fish species with similar spawning habits. Among those are two important species, the heritage fishery species lake whitefish and the economically important walleye. There has been an increase in populations of these fish in the Detroit River and the project team hopes their constructed spawning reefs would accelerate a similar recovery of these two fish species in the St. Clair River.

SECTION 4 COORDINATION AND CONSULTATION

The proposed reef projects undergo a long and explicit review and consultation process, as described in this section. Table 3 outlines the status and outcome of each type of consultation for both St. Clair and Detroit river reef locations. Although the Detroit River projects are just beginning consultation and permitting, the process would be as extensive and would likely identify any additional concerns relevant to a particular stakeholder group in a particular location.

4.1 Permits

Permits are required from the MDEQ and the USACE to establish spawning reefs on river bottomland. Permits are necessary to fill or place structures within the rivers, under the provisions of the Natural Resources and Environmental Protection Act 451,P.A. 1994, Part 301 Inland Lakes & Stream, Part 325 Submerged Lands, and Section 404 of the Federal Clean Water Act, and Section 10 of the Federal River and Harbors Act of 1899. Permit applications include a description of the project purpose, site selection criteria, alternatives considered, and spawning reef plans. All necessary permits would be obtained before habitat remediation begins. To date, all necessary federal and state permits have been granted for the St. Clair River reef sites, Pointe Aux Chenes and Harts (Table 3). Appendix D includes these permits.

In order to request a permit to add rock to the river bottom, the reef project team must receive permission from adjacent shoreline property owners, who have some ownership rights over the bottomlands of rivers and connecting channels. The USACE also issues a public notice for every project applying for a permit, allowing interested parties to submit comments and concerns. Knowing that the certain groups, such as the Lake Carriers Association, are likely to comment on spawning reef permit applications, the project team consults with them in advance of submitting a permit application. Table 3 summarizes the consultation process.

Table 5. Status of Consultation Process for each St. Clair River and Detroit River Reef Location

Reef Location	USACE Permit	MDEQ Permit	SHPO Review	Dept of State Review for Conveyance	Consultation with Lake Carriers	Consultation with Residents
Harts Light	Permit granted: LRE-2013-00867-12	Permit granted: 13-74-0149-P	Concurrence granted	Under review	Revised and approved	Shoreline landowners and township provided permission letters
Pointe Aux Chenes	Permit granted: LRE-2013-00487-12	Permit granted: 13-74-0101-P	Concurrence granted	Reviewed, no anticipated impact on conveyance	Reviewed and no concerns identified	City provided permission letter. Meeting with Russell Island residents
East Belle Isle			Concurrence granted		Reviewed and no concerns identified	City approved previous reef project at this location
Fort Wayne	Under Revision	Permit granted: 13-82-0051-P	Concurrence granted	Reviewed, no anticipated impact on conveyance	Concerns about turning freighters, design is being revised	City provided permission letter
NE Grassy Island			Concurrence granted		Reviewed and no concerns identified	

Permits granted for Harts Light and Pointe Aux Chenes sites did not include any restriction on when the proposed in-river remediation work could occur. The existing habitat at the proposed sites is seen as low quality with relatively little biological activity, and thus placement of rock material is expected to have little impact on fish spawning. The project team conducted additional consultation agencies responsible for protecting state and federally listed species, and these agencies did not recommend limiting in-water work to specific time periods.

4.2 Agency Coordination

The proposed actions are part of a long-standing collaboration involving specialists from the following organizations:

- U.S. Geological Survey, Great Lakes Science Center
- Michigan Department of Natural Resources, Fisheries Division
- U.S. Fish and Wildlife Service, Midwest Region, Alpena Fish and Wildlife Conservation Office
- The University of Michigan, Michigan Sea Grant and The University of Michigan Water Center
- SmithGroupJJR

This team has been working together for more than 10 years to research, test and improve methods for restoring spawning habitat in the St. Clair and Detroit Rivers (See Table 1 for summary of past reef projects). The reef project team meets on a regular basis to review new developments in the reef planning and assessment. An intensive research effort guided the placement and design of the proposed spawning reefs.

The proposed habitat remediation work is an integral part of the Huron-Erie Corridor Initiative (also known as the St. Clair – Detroit River System Initiative), a multi-stakeholder partnership for effective science and management of natural resources in the St. Clair – Detroit River System. Steering committee meetings involving U.S. and Canadian natural resource agencies and annual public meetings provide an opportunity to engage a wide range of state, federal, university and private entities. Restoration goals and assessment results have been discussed at past annual meetings involving representatives from more than 30 state and federal agencies, universities, tribes, non-profit groups and industries from the U.S. and Canada. This larger group has had the opportunity to review, ask questions and offer feedback on each spawning habitat remediation effort. For example, these meetings have provided an ideal opportunity, in recent years, to discuss the potential for sea lamprey to use manmade spawning reefs in the river system (See Section 3.8.2).

Through past spawning habitat remediation efforts and on-going meetings of the Huron-Erie Corridor Initiative, the reef project team has also consulted with:

- U.S. Environmental Protection Agency, Great Lakes National Program Office (USEPA GLNPO)
- The National Oceanic and Atmospheric Administration, Habitat Restoration Center
- The Detroit River International Wildlife Refuge
- Michigan Department of Environmental Quality, Office of the Great Lakes
- Ontario Ministry of Natural Resources
- Essex Region Conservation Authority
- Friends of the Detroit River, which helps administer the Detroit River Area of Concern
- Sturgeon for Tomorrow, St. Clair – Detroit River Chapter
- Great Lakes Fishery Commission, which helps administer the Sea Lamprey Control Program

Many of these partners gathered on November 24, 2013 to discuss the different remediation efforts planned for the Northeast Grassy Island area, one of the proposed Detroit River reef sites.

In addition to receiving state and federal permits and coordinating with the Michigan State Historic Preservation Office (Section 3.11 and 4.1), the reef project team also formally consults with the U.S. Department of State in advance of each project to ensure that the proposed work would not impact water conveyance through boundary waters. The Boundary Waters Treaty of 1909 gives the International Joint Commission (IJC) authority to approve and set any conditions of operation for dams or other structures that might have an impact on levels and flows of boundary waters and waters crossing the boundary. Minor encroachments and projects with little impact (such as the proposed reef development) are handled through an exchange of notes between the U.S. Department of State and Canadian Department of Foreign Affairs and International Trade. They review modeling analysis (conducted by Environment Canada and the USACE) to determine the significance of any impact and whether to refer to IJC for decision. U.S. Department of State has already provided approval for reef development at Pointe Aux Chenes and Harts Light (St. Clair River) and Fort Wayne (Detroit River). Because the proposed activities are not controlling or modifying the hydrology of the rivers in any detectable way, the project team determined that it was not necessary to conduct a formal consultation regarding hydrological impacts for fish and wildlife service, which sometimes occurs under the Fish and Wildlife Coordination Act.

In support of this EA, several agencies have provided letters of support and a summary of their involvement (See Appendix A). Letters were provided by:

- The National Oceanic and Atmospheric Administration, Habitat Restoration Center
- Michigan Department of Environmental Quality, Office of the Great Lakes
- Michigan Department of Natural Resources, Fisheries Division
- U.S. Fish and Wildlife Service, Midwest Region, Alpena Fish and Wildlife Conservation Office
- National Fish and Wildlife Foundation, Sustain our Great Lakes Program
- Sturgeon for Tomorrow, the St. Clair – Detroit River Chapter

4.3 Public Involvement

The reef project team consults with property owners before finalizing project plans and requests letters of permission to accompany permit applications, as required by the State of Michigan. To-date the City of Detroit, City of Algonac and East China Township have provided letters of support for specific reef locations described in this EA (Appendix E).

The Harts Light Reef is located adjacent to private homes in East China, Michigan. The bottomlands of inland rivers as well as Great Lakes connecting channels are not public trust land like the Great Lakes bottomlands themselves. Upland property owners have some ownership rights over the adjacent riparian bottomlands and their permission is needed to complete the proposed work.

Michigan Sea Grant reached out to public officials and residents of East China Township to explain the proposed habitat remediation work and invite their support. Reef project team members dropped off packets at approximately 25 homes along the St. Clair River and talked with many of the residents in person or over the phone. A public meeting was held on June 26, 2013 at the Township Hall for shoreline residents. A larger evening rotary event was held in Algonac on October 2, 2013. Residents had questions about the reef development process and how the completed reefs would affect navigation, swimming and fishing. No one indicated objections to the project and many people signed a permission letter on the spot. We received permission letters from 19 properties along the St. Clair River and used

this information to finalize the reef placement and layout. The materials provided to homeowners are available in Appendix E.

As part of the permitting process, the USACE issues a formal public notification and manages a public comment period for proposed projects. The public comment process has allowed the reef project team to identify and respond to concerns identified by the Lake Carriers Association and homeowners on Russell Island (See Section 3.3: Social Impacts). Feedback received from these groups has caused the team to modify the location, dimensions and project timeframe for the St. Clair River projects. The reef project team fully expects that the USACE permitting and public notification process would continue to facilitate public involvement in the final decisions related to the proposed Detroit River projects. In many ways the USACE facilitated public comment process is most appropriate for this goal because they have in-water permitting authority and an established distribution system that targets the most relevant stakeholders. In addition, this EA would be made available online through the Michigan Sea Grant website: www.miseagrant.umich.edu/restoration and the Huron-Erie Corridor Initiative website: http://www.huron-erie.org/.

Presentations, public meetings and events that have been, or will be, held about the planned spawning reef projects:

- Meeting with shoreline homeowners, East China Town Hall, June 26, 2013.
- Public presentation and booth at Sturgeon Fest, Maritime Center, Port Huron, June 2, 2013.
- Meeting with Russell Island Residents, Algonac Ferry Dock, August 26, 2013.
- Public Presentation sponsored by the Algonac Rotary Club, Seafarers International Union Hall, Algonac, Michigan, October 2, 2013.
- Presentation at Listening Session held by Belle Isle State Park, January 23, 2014.
- Presentation at the Huron-Erie Corridor Initiative Meeting, February 5, 2014
- Presentation at the Binational Public Advisory Council for the St. Clair River Area of Concern, Port Huron, March 25, 2014
- Presentation at the Great Lakes Fishery Commission Lake Committee Meetings, Windsor Ontario, March 26, 2014
- Public Presentation sponsored by Sturgeon for Tomorrow, Algonac Clay Library, April 8, 2014.
- Presentation at the Lake Huron Fishery Workshop, Port Huron, April 9, 2014
- Presentation at the Lake St. Clair Fishery Workshop, Clinton, April 15, 2014
- Presentation at the Lake Erie Fishery Workshop, Monroe, April 17 2014.

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- Joe Wywrot, Engineer, SmithGroupJJR, Ann Arbor, Michigan
- Larry Herrington, Environmental Specialist, Branch of Management Services, USGS, Reston, Virginia
- Esther Eng, Chief, Environmental Management Branch, USGS, Reston, Virginia

Environmental Assessment

Remediating Native Fish Spawning Habitat in the St. Clair – Detroit River System

June, 2014

APPENDICES

LIST OF APPENDICES

APPENDIX A. Letters of Support from Partner and Cooperating Agencies

- U.S. Fish and Wildlife Service, Midwest Region, Alpena Fish and Wildlife Conservation Office
- Michigan Department of Natural Resources, Fisheries Division
- The National Oceanic and Atmospheric Administration, Habitat Restoration Center
- National Fish and Wildlife Foundation, Sustain our Great Lakes Program
- Michigan Department of Environmental Quality, Office of the Great Lakes
- Letter from Sturgeon for Tomorrow, St. Clair – Detroit River Chapter

APPENDIX B. Documentation Relevant to Social Impacts

- Example Email Consultation with the Lake Carriers Association
- Letter from the Lake Carriers Association about the Pointe Aux Chenes Permit
- Letter from resident and local angler and boater in support of Pointe Aux Chenes Permit
- Letter from Aamjiwnaaang First Nation in support fish spawning reefs at Fighting Island

APPENDIX C. Coordination with the State Historic Preservation Office

- Concurrence letter for all reef areas described in EA. Figures 9, 10, 12, 13, 14 were provided to the State Historic Preservation Office for review in fall of 2013.

APPENDIX D. Permits

- MDEQ Permit for the Fort Wayne Reef
- MDEQ Permit for the Pointe Aux Chenes Reef
- USACE Permit for the Pointe Aux Chenes Reef
- MDEQ Permit for the Harts Light Reef
- USACE Permit for the Harts Light Reef

APPENDIX E. Documentation Relevant to Public Involvement

- Letter of Support, City of Detroit
- Letter of Support, City of Algonac
- Letter of Support, East China Township
- Project Fact Sheet, highlighting the St. Clair River projects
- Letter distributed to shoreline residents in East China
- Letter signed by all shoreline homeowners adjacent to Harts Light Reef

APPENDIX F. Documentation Relevant to Endangered and Threatened Species

- Correspondence with US Fish and Wildlife Service regarding federally listed species.
- Letter stating no effect likely for federally listed species, generated through e-consultation
- USFWS Fact Sheet - Rayed Bean *(Villosa fabalis)*
- USFWS Fact Sheet - Northern Riffleshell *(Epioblasma torulosa rangiana)*
- Correspondence with MDNR Wildlife Division about the need for a Rare Species Review.
- Letter from MNFI regarding Rare Species Review #1425 (Harts Light Reef, St. Clair River)

- Letter from MNFI regarding Rare Species Review #1426 (Point Aux Chene Reef, St. Clair River)
- Letter from MNFI regarding Rare Species Review #1427 (East Belle Isle Reef, Detroit River)
- Letter from MNFI regarding Rare Species Review #1428 (Fort Wayne Reef, Detroit River)
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APPENDIX A. LETTERS OF SUPPORT FROM PARTNER AND COOPERATING AGENCIES

- U.S. Fish and Wildlife Service, Midwest Region, Alpena Fish and Wildlife Conservation Office
- Michigan Department of Natural Resources, Fisheries Division
- The National Oceanic and Atmospheric Administration, Habitat Restoration Center
- National Fish and Wildlife Foundation, Sustain our Great Lakes Program
- Michigan Department of Environmental Quality, Office of the Great Lakes
- Letter from Sturgeon for Tomorrow, St. Clair – Detroit River Chapter

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Alpena Fish and Wildlife Conservation Office
480 West Fletcher Street
Alpena, Michigan 49707
Phone: (989) 356-3052 Fax: (989) 356-4651

November 5, 2013

Esther Eng
Chief, Environmental Management Branch
U.S. Geological Survey
12201 Sunrise Valley Drive MS-207
Reston, VA 20192

Dear Esther Eng:

Over the past ten years, the U.S. Fish and Wildlife Service-Alpena Fish and Wildlife Conservation Office (Alpena FWCO) has collaborated with Bruce Manny (USGS), Jennifer Read (University of Michigan) and others to develop, study, and refine methods for creating spawning habitat in the St. Clair-Detroit River System. The Alpena FWCO has been part of the planning for three completed spawning reef projects and participated in meetings and field work to develop the scope for the proposed work described in the Environmental Assessment: Restoring Fish Spawning Habit in the Huron-Erie Corridor.

Lake sturgeon are a priority species for the U.S. Fish and Wildlife Service, in part because this fish species is listed as threatened or of special concern in all but one of the Great Lakes states and provinces. The proposed restoration work provides an important opportunity to study population dynamics and aid the recovery of lake sturgeon in the Great Lakes.

The Alpena FWCO will support the proposed spawning habitat creation work in a number of ways. Staff at the Alpena FWCO possesses the unique capacity to evaluate adult and juvenile fish use of the spawning reef using multiple gear types. This field work is typically accomplished through agreements with U.S. Geological Survey and the Michigan Department of Natural Resources. In addition, the U.S. Fish and Wildlife Service's Coastal Program has provided additional funds to expand several past and future reef projects. As such, the Alpena FWCO has been and will continue to be a key partner in the proposed spawning habitat restoration work, supporting both the science and public relations.

Please do not hesitate to contact me if you have any questions about the work described in the Environmental Assessment: Restoring Fish Spawning Habitat in the Huron-Erie Corridor.

Sincerely,

Scott Koproski, Project Leader
Alpena Fish and Wildlife Conservation Office
(989) 356-3052
scott_koproski@fws.gov

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING

RICK SNYDER
GOVERNOR

KEITH CREAGH
DIRECTOR

Esther Eng
Chief, Environmental Management Branch
U.S. Geological Survey
12201 Sunrise Valley Drive MS-207
Reston, VA 20192

March 25, 2014

Dear Esther Eng:

I am the Lake Erie Basin Coordinator with the Michigan Department of Natural Resources (MDNR) Fisheries Division. MDNR has worked closely with Bruce Manny (USGS) and Jennifer Read (U. Michigan) and others to develop, study and refine methods for creating spawning habitat in the St. Clair- Detroit River System. MDNR has been part of the planning for two completed spawning reef projects and participated in meetings and field work to develop the scope for the proposed work described in the *Environmental Assessment: Remediating Native Fish Spawning Habit in the St. Clair – Detroit River System.*

Lake sturgeon are an important species for MDNR because the fish is listed as threatened in Michigan as well as most other Great Lakes states and provinces. The proposed restoration work provides an important opportunity to study population dynamics and aid the recovery of lake sturgeon in the Great Lakes.

MDNR Fisheries has supported past spawning reef projects in a few ways, and at least some of these activities are likely to continue in support of the proposed projects. The MDNR Lake St. Clair Field Station is conveniently located on the shores of Lake St. Clair and has provided office space, docks, equipment, personnel and other support for field teams in the St. Clair delta and river. MDNR's unique research capacity and long-term monitoring program have helped choose reef sites, evaluate project impacts and interpret results. In addition, we have supported proposals for restoration funding by providing valuable non-federal match for several grant applications. As such, MDNR has been and will continue to be a partner in the proposed spawning habitat restoration work, supporting both the science and public relations.

We support the on-going planning and development of the proposed reef projects described in the *Environmental Assessment: Remediating Native Fish Spawning Habitat in the St. Clair – Detroit River System.* Do not hesitate to contact me if you have any questions.

Sincerely,

James Francis
Lake Erie Basin Coordinator
Michigan DNR-Fisheries Division
525 W. Allegan Street
Lansing, MI 48933

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

Esther Eng
Chief, Environmental Management Branch
U.S. Geological Survey
12201 Sunrise Valley Drive MS-207
Reston, VA 20192

November 20, 2013

Dear Esther Eng:

I am a Federal Program Officer for the Great Lakes Region for the National Oceanic and Atmospheric Administration (NOAA) Restoration Center. We provide grant funds and technical advice for restoration projects that will improve coastal and near shore habitats in the Great Lakes. In 2010, we provided a $890,233 grant to Michigan Sea Grant (PI: Jennifer Read; Grant Number: NA10NMF4630409) to create a fish spawning reef in the Middle Channel of the St. Clair River. We awarded this grant through a competitive funding opportunity where it was one of the top scoring proposals based on a merit-based technical review and subsequent panel review process. The proposal was selected based on the proposed benefits the restoration work would have to native fish communities in the St. Clair – Detroit River System; the overall qualifications of the project team; and collaboration among multiple federal and state agencies.

The Middle Channel Reef project has been a successful habitat restoration project. The team created an acre of spawning habitat in 2012 and observed lake sturgeon spawning on the reef in 2012 and 2013. The restoration team included a number of state and federal agencies with unique research and monitoring capacity. USGS scuba divers captured video footage of spawning lake sturgeon and lake sturgeon eggs on the reef, which has attracted the attention of the media and public. The project proceeded without controversy, and local residents and permitting agencies were supportive of the project from the beginning.

Through funding or technical expertise, the Restoration Center supports approximately 100 habitat restoration projects each year. Each project is assessed for NEPA compliance by determining the environmental impacts of project activities using a programmatic NEPA document developed by the NOAA Restoration Center. For the Middle Channel Reef project, we coordinated with the Michigan State Historic Preservation Office and U.S. Fish and Wildlife Service and completed our own detailed review of the project. We found the Middle Channel Reef project to have no significant impact on the local or regional environment.

We expect the team led by Jen Read and Bruce Manny to fully evaluate all possible ecological and social impacts of their reef construction projects and to work closely with state and federal permitting

agencies. Based on our experience, reef construction projects that follow the planning and implementation process used successfully for the Middle Channel Reef are unlikely to have any significant impact on the human environment. Do not hesitate to contact me if you have any questions about NEPA compliance for the Middle Channel Reef project.

Sincerely,

Jessica Berrio
Federal Program Officer
NOAA Restoration Center
jessica.berrio@noaa.gov
Ph: 301-427-8654

NATIONAL FISH and WILDLIFE FOUNDATION
CENTRAL PARTNERSHIP OFFICE
8011 34th Avenue South, Suite 444
Bloomington, MN 55425
P 612-564-7296 | **F** 612-564-7297 | nfwf.org

February 21, 2014

Esther Eng
Chief, Environmental Management Branch
U.S. Geological Survey
12201 Sunrise Valley Drive MS-207
Reston, VA 20192

Dear Esther Eng:

The National Fish and Wildlife Foundation manages a grants program called Sustain Our Great Lakes, which supports habitat restoration in the Great Lakes basin. The program awards funding from several sources, including the federal Great Lakes Restoration Initiative (GLRI). Our grants supported with GLRI funding are subject to requirements under the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and the National Historic Preservation Act, and we work with the U.S. Fish and Wildlife Service (USFWS) to ensure compliance with those requirements.

In 2012, Sustain Our Great Lakes provided a grant of $799,226 to the University of Michigan to create approximately one acre of spawning habitat in the Detroit River at Fort Wayne. Because GLRI funding was used to support that grant, the USFWS Regional Office in Bloomington, MN reviewed the project for potential impacts. Following its review, the USFWS concluded the project was covered by the following standard Fish and Wildlife Categorical Exclusion under NEPA: "the construction of new, or the addition of, small structures or improvements, including structures and improvements for the restoration of wetland, riparian, instream, or native habitats, which result in no or only minor changes in the use of the affected local area" (Reference: DOI Department Manual 516 DM 8, Section 8.5.B.3). In addition, the USFWS concluded the project was not likely to adversely affect listed or candidate species or critical habitat designated under the ESA, and a review by the Michigan State Historic Preservation Office indicated no historic properties would be affected within the action area of the project.

Since those reviews were completed, the project location has changed, and the new plan is to build a reef upstream of Belle Isle or Grassy Island rather than at Fort Wayne. Given this change, we will work with the USFWS to complete a new set of reviews, using a process similar to the one described above.

Please don't hesitate to contact me (612-564-7286; todd.hogrefe@nfwf.org) if you have any questions.

Sincerely,

Todd C. Hogrefe
Great Lakes Program Director

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
OFFICE OF THE GREAT LAKES
LANSING

JON W. ALLAN
DIRECTOR

December 4, 2013

Ms. Esther Eng, Chief
Environmental Management Branch
United States Geological Survey
12201 Sunrise Valley Drive, MS-207
Reston, VA 20192

Dear Ms. Eng:

I am the Deputy Director of the Office of the Great Lakes within the Michigan Department of Environmental Quality (MDEQ). We are responsible for a number of Great Lakes programs including the Area of Concern program under the Great Lakes Water Quality Agreement. I am writing to express support for the Michigan Sea Grant's proposed work described in the document entitled *Environmental Assessment: Restoring Fish Spawning Habitat in the St. Clair – Detroit River System.*

The MDEQ works closely with the United States Environmental Protection Agency and Public Advisory Councils to oversee the planning and delisting processes for Michigan's Areas of Concern (AOCs). Both the St. Clair and Detroit Rivers were identified as AOCs under the United States - Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol) because they experienced severe environmental degradation resulting in a number of Beneficial Use Impairments. The fish habitat restoration work proposed by the Michigan Sea Grant has been identified by both AOCs as essential to addressing Beneficial Use Impairments related to lost fish and wildlife habitat and degraded fish and wildlife populations. Recent reports referenced these reef construction projects as part of the delisting targets for both the St. Clair River (updated in 2012) and the Detroit River (updated in 2013).

In addition, the MDEQ's Water Resources Division provides permits for each reef construction project. Over the past 10 years, the MDEQ has provided permits to construct spawning reefs at two locations in the St. Clair River (Middle Channel and Pointe aux Chenes) and two locations in the Detroit River (Southeast Belle Isle and Fort Wayne).

The spawning habitat restoration work described in this Environmental Assessment is important to the goals and work of the MDEQ's AOC program, and we see no potential adverse impacts associated with these proposed projects.

If you need further information or assistance, please do not hesitate to contact Mr. Rick Hobrla at hobrlar@michigan.gov, or at 517-284-5043, or you may contact me.

Sincerely,

Lynelle Marolf
Deputy Director
517-284-5035

cc: Mr. Rick Hobrla

Esther Eng
Chief, Environmental Management Branch
U.S. Geological Survey
12201 Sunrise Valley Drive MS-207
Reston, VA 20192

11-7-2013

Dear Esther Eng:

I am the president and one of the founding members of the St. Clair – Detroit River Sturgeon for Tomorrow. In addition, I am a lifelong resident of Marine City and Algonac and a regular fisherman and boater. I first connected with Bruce Manny (USGS) and Jennifer Read (U. Michigan) when they were building a spawning reef in the Middle Channel of the St. Clair River.

I have provided assistance for the completed and planned reef projects in a few ways. The team often asks for my advice about conditions on the river and how to best work with residents. I participated in several public events about the reef projects and have been working to raise money to add additional signage to the river front about sturgeon habitat restoration. In addition, I helped talk with shoreline homeowners living adjacent to the Harts Light Reef to request letters of permission. Although not everyone feels a personal connection with lake sturgeon, public officials and residents are realizing that the St. Clair River and its unique fish communities are an incredible asset to the towns and should be protected, enhanced and promoted. Here are just a few examples illustrating public interest in lake sturgeon restoration. Efforts are underway to designate Clay Township the Sturgeon Angling Capitol of Michigan, because this is one of the few places in the Great Lakes where sturgeon can be legally and reliably caught by recreational anglers. Michigan Out-of-Doors (a popular TV show) recently filmed an episode about lake sturgeon fishing in the St. Clair River. After a recent rotary event about sturgeon and spawning habitat restoration, a group of residents volunteered to form a sturgeon task force to reduce sturgeon poaching. I am excited to support efforts to create additional spawning habitat for these unique and charismatic fish, benefiting the environment and local communities.

The only local concern with the proposed reef projects has come from a small group of people who live on Russell Island and depend on a ferry to get to their seasonal cottages. These residents were worried that reef construction, monitoring vessels or anglers fishing the reef would interfere with their ferry. However, there was some confusion about the actual location of the Pointe aux Chenes Reef, which is actually more than 300 feet upstream from the ferry route and unlikely to interfere with the ferry operation. This stretch of the St. Clair North Channel is very popular with recreational boaters. A small amount of additional activity in the river during construction will be minimal in comparison with the existing boat traffic.

The reef projects described in this Environmental Assessment : Remediating Native Fish Spawning Habitat in the St. Clair – Detroit River System are seen as important to the goals of Sturgeon for Tomorrow and we see no potential adverse impacts associated with these proposed projects. Do not hesitate to contact me if you have any further questions.

Sincerely,

Jim Felgenauer, President
St. Clair-Detroit River Sturgeon for Tomorrow
810 343-1192
jfelgenauer@gmail.com

APPENDIX B. DOCUMENTATION RELEVANT TO SOCIAL IMPACTS

- Example Email Consultation with the Lake Carriers Association
- Letter from the Lake Carriers Association about the Pointe Aux Chenes Permit
- Letter from resident and local angler and boater in support of Pointe Aux Chenes Permit
- Letter from Aamjiwnaaang First Nation in support fish spawning reefs at Fighting Island

UNIVERSITY OF MICHIGAN

Lynn Vaccaro <lvaccaro@umich.edu>

Proposed Alternate Detroit River Reef Sites and St Clair Sites

2 messages

Jennifer Read <jenread@umich.edu> Fri, Aug 2, 2013 at 11:13 AM
To: Glen Nekvasil <nekvasil@lcaships.com>
Cc: Lynn Vaccaro <lvaccaro@umich.edu>

Good morning, Glen.
Please find attached a four page pdf. The first two pages show the proposed Harts Light reef locations in the St Clair -- we're in the process of developing permit applications for these sites as well so feedback on them will be important for us as we move forward. The next two pages show three alternate sites for the Detroit River, two up at Belle Isle and one just upstream of Grassy Island.

We realize that some of these locations are in or close to the shipping channel but there are very few areas of deep water (>20 ft), fast-moving current (>.65 m/s) and smooth, hard river bottom where there's unlikely to be existing habitat to disturb that are outside the shipping channel. We really appreciate your help locating those sweet spots that won't also impact your members.

Looking forward to feedback from your members.
Best, Jen

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Jennifer G Read, Ph.D.
Deputy Director, University of Michigan Water Center
A center of the Graham Sustainability Institute
and
Executive Director, Great Lakes Observing System

p: 734.763.2642
c: 734.769.8898

Proposed Reef Sites Detroit River and St Clair.pdf
1725K

Glen Nekvasil <Nekvasil@lcaships.com> Mon, Aug 5, 2013 at 7:30 AM
To: Jennifer Read <jenread@umich.edu>
Cc: Lynn Vaccaro <lvaccaro@umich.edu>

Jen, I'll get this out this morning.

Best,

Glen
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

From: Jennifer Read [mailto:jenread@umich.edu]
Sent: Friday, August 02, 2013 11:14 AM
To: Glen Nekvasil
Cc: Lynn Vaccaro
Subject: Proposed Alternate Detroit River Reef Sites and St Clair Sites

[Quoted text hidden]

UNIVERSITY OF MICHIGAN

Lynn Vaccaro <lvaccaro@umich.edu>

Fwd: LCHarts Lights a Problem: A Comments on Proposed Alternate Detroit River and St. Clair River Spawning Sites

Jennifer Read <jenread@umich.edu> Tue, Aug 6, 2013 at 11:04 AM
To: Lynn Vaccaro <lvaccaro@umich.edu>, Paul Evanoff <Paul.Evanoff@smithgroupjjr.com>

FYI and for discussion tomorrow hopefully
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Jennifer G Read, Ph.D.
Deputy Director, University of Michigan Water Center
A center of the Graham Sustainability Institute
and
Executive Director, Great Lakes Observing System

p: 734.763.2642
c: 734.769.8898

---------- Forwarded message ----------
From: **Glen Nekvasil** <Nekvasil@lcaships.com>
Date: Tue, Aug 6, 2013 at 10:53 AM
Subject: LCA Comments on Proposed Alternate Detroit River and St. Clair River Spawning Sites
To: Jennifer Read <jenread@umich.edu>
Cc: "James H. I. Weakley" <weakley@lcaships.com>, Etienne Seguin-Bertrand <seguin-bertrand@shipowners.ca>, "Bill Capt. Millar (william.millar@gatx.com)" <william.millar@gatx.com>, "Captain John P. Wellington (wellington@lighthouse.net)" <wellington@lighthouse.net>, David Schultze <dschultze@keyship.com>, "dgroh@vtbarge.com" <dgroh@vtbarge.com>, "diane.tokarczyk@gatx.com" <diane.tokarczyk@gatx.com>, "Ed Wiltse (ewiltse@grnavigation.com)" <ewiltse@grnavigation.com>, "Edward J. Hogan (ehogan@portcitytug.com)" <ehogan@portcitytug.com>, "Gerry Walls (gwalls@keyship.com)" <gwalls@keyship.com>, "Jack VanEnkevort (jvanenkevort@vtbarge.com)" <jvanenkevort@vtbarge.com>, "Jayson E. Toth (jtoth@interlake-steamship.com)" <jtoth@interlake-steamship.com>, Jessica Smith <jsmith@vtbarge.com>, "Ken Gerasimos (kgerasimos@keyship.com)" <kgerasimos@keyship.com>, "Kevin McMonagle (KPMCMONAGLE@gatx.com)" <KPMCMONAGLE@gatx.com>, "klelinski@gatx.com" <klelinski@gatx.com>, "Mark J. Rohn (mrohn@grnavigation.com)" <mrohn@grnavigation.com>, "Mark W. Mather (mather@pmship.com)" <mather@pmship.com>, "Mark.Pietrocarlo@gatx.com" <Mark.Pietrocarlo@gatx.com>, Michael Taetsch <mtaetsch@grnavigation.com>, "Mike McDermott (MMcDermott@GRNavigation.com)" <MMcDermott@grnavigation.com>, "Noel Bassett (E-mail)" <nlbassett@gatx.com>, "pstrop@chartermi.net" <pstrop@chartermi.net>, "Rick Turman (rturman@grnavigation.com)" <rturman@grnavigation.com>, "Robert F. Dorn (rdorn@interlake-steamship.com)" <rdorn@interlake-steamship.com>, "Romich, Rachel. (rromich@keyship.com)" <rromich@keyship.com>, Steven Stanek <sstanek@andrie.com>, Tom Wiater <tom@centralmarine.us>, "tom.anderson@gatx.com" <tom.anderson@gatx.com>, "Traffic Dept. ASC (asctraffic@gatx.com)" <asctraffic@gatx.com>, "William C. Peterson (wpeterson@keyship.com)" <wpeterson@keyship.com>, "WilliamCarle@interlake-steamship.com" <WilliamCarle@interlake-steamship.com>

Morning Jennifer:
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

We've reviewed the proposed sites and can tentatively approve two of the three.

The Belle Isle Reef, Upper Detroit, Location A is acceptable as drawn, but what's the water depth at A (and at B)?

Location B also appears acceptable, provided it's near a 26-foot depth and does not extend into the Federal channel. Ice can pile up in this area, so it is very important that we maintain the water depths as currently stated.

Grassy Island Reef, Detroit River is acceptable as long as it is near a 26-foot foot depth within 100 feet of the Federal channel.

Harts Light Reef, St. Clair is not acceptable to commercial navigation. The reef would be in the middle of the western 1/3rd of the navigation channel. Ships transit directly over this area and barges and survey boats would be a real hazard to commercial navigation. We must ask that you look elsewhere.

Please keep us abreast of developments. We'll always review and help find a location that works for all.

Sincerely,

Glen

Glen G. Nekvasil

Vice President

Lake Carriers' Association

20325 Center Ridge Rd.

Suite 720

Rocky River, OH 44116

Phone: 440-333-9996

Cell: 216-702-6360

UNIVERSITY OF MICHIGAN

Lynn Vaccaro <lvaccaro@umich.edu>

Fwd: St Clair River Harts Light Location for Spawning Bed

Jennifer Read <jenread@umich.edu> Thu, Oct 24, 2013 at 12:05 PM
To: Glen Nekvasil <nekvasil@lcaships.com>
Cc: Lynn Vaccaro <lvaccaro@umich.edu>

Good afternoon Glen

Please find attached a revised lay out for the Harts Light location in the St Clair River. In revising the layout, the project team carefully considered the concerns of your members. Based on your input, we significantly revised the reef layout to keep the reefs in deep water close to shore, which meant eliminating the third, southernmost unit and changing the dimensions and placement of the other reef units. In addition, during construction and assessment we will require that contractors and research vessels yield to commercial freighters. We also agree that commercial navigation interests will not be held liable for any accidental damage to the reef. We are sharing these revised drawings that we plan to submit for permitting toward the middle of next week and would appreciate your feedback regarding your membership's level of comfort with the revised plan. In our permit application, we will inform the Corps that we worked with LCA in finalizing our plans prior to seeking permits.

The attached document is 5 pp total including:

- Cover drawing showing lay-out of the proposed project relative to river's edge and placement in the river;
- Two following drawings (pp 2-3) showing depth at various points on the proposed reefs;
- Two final drawings (pp 4-5) showing latitudinal and longitudinal cross sections.

We very much appreciate your feedback and continued support of our efforts to restore fish populations.

Best, Jen

Jennifer G Read, Ph.D.
Deputy Director, University of Michigan Water Center
A center of the Graham Sustainability Institute
and
Executive Director, Great Lakes Observing System

p: 734.763.2642
c: 734.769.8898

On Mon, Sep 9, 2013 at 8:34 AM, Glen Nekvasil <Nekvasil@lcaships.com> wrote:

> Jennifer:
>
> We reviewed this and have the following comments:
>
> Based on Corp surveys there is much more water in that area than project

depth. Depths range between 38-39 feet at low water datum along the western channel limits. So, the portion of the reef that is positioned in the Federal channel must always be at least 8 feet lower than project depth. We would not want to see the reef built up to near project depths, especially in times of lower water.

We would need guarantees that the outer, eastern limits of the reef would not extended anymore than 400 feet into the river. As it is the reef is extending into more than a quarter of the river's width in this area.

Contactors and research vessels must be required to move/yield when a vessel is approaching.

Commercial navigation is not liable for any damages of any type or proportion to the sections of the artificial reef that lay within the Federal navigation channel.

If this is amenable to you, we can accept the reef.

Let me know.

Best,

Glen Nekvasil

2013-1023 Harts Light Drawings.pdf
1500K

UNIVERSITY OF MICHIGAN

Lynn Vaccaro <lvaccaro@umich.edu>

Re: Revised St Clair River Harts Light Location for Spawning Bed

1 message

Jennifer Read <jenread@umich.edu> Tue, Nov 12, 2013 at 3:27 PM
To: Glen Nekvasil <Nekvasil@lcaships.com>
Cc: Lynn Vaccaro <lvaccaro@umich.edu>

Thank you Glen. We really appreciate the chance to work with you and your members in advance to stream line our permitting process!

Best, Jen

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Jennifer G Read, Ph.D.
Deputy Director, University of Michigan Water Center
A center of the Graham Sustainability Institute
and
Executive Director, Great Lakes Observing System

p: 734.763.2642
c: 734.769.8898

On Tue, Nov 12, 2013 at 12:14 PM, Glen Nekvasil <Nekvasil@lcaships.com> wrote:

> This meets our needs. Thank all for their cooperation and flexibility.
>
> Glen
>
> Glen G. Nekvasil
> Vice President
> Lake Carriers' Association
> 20325 Center Ridge Rd.
> Suite 720
> Rocky River, OH 44116
> Phone: 440-333-9996
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cell: 216-702-6360

Lake Carriers' Association

The Greatest Ships on the Great Lakes

JAMES H. I. WEAKLEY, PRESIDENT
440-333-9995 • weakley@lcaships.com

August 1, 2013

CORPS FILE NO. LRE-2013-00487-12

Via E-Mail: Stanley.F.Cowton@usace.army.mil
Mr. Wally Gauthier
Chief, Permit Evaluation Branch B
Regulatory Office
Detroit District, Corps of Engineers
477 Michigan Ave.
Detroit, MI 48226-2550

Dear Mr. Gauthier

Proposed Fish Spawning Habitat in the St. Clair River at Algonac, Michigan

Lake Carriers' Association ("LCA") represents 17 American companies that operate 57 U.S.-flag vessels ("lakers") on the Great Lakes and carry the raw materials that drive the nation's economy: iron ore and fluxstone for the steel industry, aggregate and cement for the construction industry, coal for power generation, as well as salt, sand and grain. Collectively, our members can transport more than 115 million tons of dry-bulk cargo per year and employ more than 1,600 men and women, all of whom are U.S. citizens or legally admitted aliens, and provide annual wages and benefits of approximately $125 million. In turn, the cargos our members carry generate and sustain more than 103,000 jobs in the eight Great Lakes and have an economic impact of more than $20 billion.

We have reviewed the application and determined that the spawning ground will not interfere with commercial navigation. Therefore, we have no objection to the project and wish all involved every success.

Very respectfully,

James H. I. Weakley
President

G:\WEAKLEY\LETTERS\2013\080113 Fish Spawning Habitat in St. Clair River at Algonac.docx

8-26-2013

Mr. Stan Cowton
US Army Corps of Engineers
Regulatory Office
477 Michigan Avenue
Detroit, MI 48226-2550

Re: Corp File No. LRE-2013-00487-12

Dear Mr. Cowton,

It was a pleasure to meet you at the public meeting held at the parking lot of the Russell Island Ferry in Algonac this morning. Though I am the president and one of the founding members of St. Clair-Detroit River Sturgeon for Tomorrow, I am writing this as a life long resident of Marine City and Algonac and as a regular fisherman and boater.

Your Public Notice of July 31, 2013 regarding this file indicates that all factors which may be relevant to the proposal will be considered including land use, navigation and recreation. At the meeting this morning some other local area residents with homes on Russell Island, including the ferry operator, expressed a specific concern that reef construction would result in increased recreational angling over the site therefore impeding ferry operations and access to the island. I would like to address those concerns.

1. Most fishing pressure occurs in the springtime. Up until recently the Russell Island ferry was located slightly over 2000 feet upstream of the present location in an area of higher angling pressure in the springtime. Recreational Anglers jigging for walleyes, including myself, commonly finish their drift below that location. Though inconvenient, I cannot recall there ever being a collision between the ferry and a fishing boat. There is much less fishing activity at the current dock location. Please also understand the primary species sought in the St. Clair River is walleyes. Fishing pressure is higher in the spring due to the fact that most of the fish in the system are caught during the post-spawn dispersal from spawning sites further downstream. Some fish remain in the river and are caught throughout the summer but fishing pressure subsides as many of the walleyes move into lower Lake Huron and Memorial Day brings higher numbers of large cabin cruisers to the river. Smallmouth bass are sporadically targeted by tournament fishermen during the summer. The little fishing pressure that occurs in the area of the proposed reef during the spring walleye run subsides during the rest of of the year. There may be some slight additional pressure in the spring if walleyes are using the reef as a spawning or holding area. But it is unlikely that they will occupy the site through the summer.

2. I am sure you must have noticed during your visit this morning that heavy cruisers are more commonly seen plying this narrow channel bordered by a long seawall. The St. Clair River has a very high level of boat traffic that the Russell Island ferry must contend with on a daily basis. Most of this traffic is from large recreational boats, not fishermen. In this particularly narrow part of the river, boat wakes make navigation and anchoring difficult at best for recreational anglers. This is one of the roughest areas of the river in which to try to fish. Most fishermen are on the river early and off by mid morning to avoid being run over or thrown about in the wakes of these large boats. It is sad to say that many of those driving the big boats do not know the rules of the

road, are in many cases intoxicated, and are inconsiderate. A go-fast boat ran into the Harsens Island Ferry this past Saturday night. I am an avid fisherman that would never consider fishing over a reef near the middle of the fairway, in a narrow channel dominated by big boats, with less than considerate or competent operators. That is one of the very reasons I would never attempt to fish the reef in the upper middle channel. You should look at the view of this part of the river on Google Earth. You will understand completely if you do.

3. Another reason I do not expect heavy fishing pressure at the location of the reef is that most fishermen will not even be aware of the fact that it is there. As much as we try to publicize the reef, many people do not take the time for keep up with current events. Even if they know it is there, they are not likely to spend much time fishing there. Anglers, including most of my friends, are creatures of habit. We all have our favorite lures and fishing locations and tend to stick with what we have done in the past. I almost always anchor in the same spot when fishing for sturgeon. There is an old adage that you do not leave fish to find fish. You have to go with your confidence. Again, I believe the reef will not hold the primary target species throughout the year.

4. The reef completed in the upper part of the middle channel one year ago has not drawn a plethora of anglers to it. I would have expected that if there were going to be more activity on that reef that it would have occurred by now. I expect this precedent to be followed when a reef is constructed at the south end of Algonac.

To summarize. Anglers cannot fish over the top of a reef they do not know exists. The Russell Island Ferry is located in a busy, narrow channel. On a daily basis the ferry operator must contend with a high level of traffic which is dominated by large cruisers but does at times include some fishermen. Admittedly, some fishermen are inconsiderate of the fact that their activities might cause some inconvenience to the ferry and maintain their right of way as boats not under power. Most fishing boats are much smaller than the ferry and would not fare well in a collision. Most fisherman in my experience are much more considerate than the cruiser operators more commonly encountered by the ferry operator. Though there may be some slight additional fishing activity in the springtime or early morning, that activity will not persist through the summer because the primary target species will have moved off the reef. It is unsafe, unwise and very uncomfortable to try to fish in that location in the presence of the large volume of heavy cruiser traffic. Most fishermen will not put themselves through that any more than they would ride their bicycle down the middle lane of the freeway during rush hour. Anglers are creatures of habit and are more likely to continue to fish where they have had past success. Any slight increase in fishing activity that would be likely to occur in the early spring or early morning is minimal compared to what the ferry operator already must contend with on a daily basis.

I can be reached almost anytime on my cell phone at 810 343-1192 or by email at jfelgenauer@gmail.com if you have any additional questions. I appreciate the opportunity to comment.

Jim Felgenauer
President, St. Clair-Detroit River Sturgeon for Tomorrow
378 North Avenue
Algonac, MI 48001
810 794-5036

AAMJIWNAANG FIRST NATION
CHIPPEWAS OF SARNIA
Band Council

978 TASHMOO AVENUE
SARNIA, ONTARIO
N7T 7H5
Phone: (519) 336-8410
Fax: (519) 336-0382

September 23, 2013

LGL Limited,
Environmental Research Associates
22 Fisher Street,
P.O. Box 280
King City, ON
L7B 1A6

Attention: Joseph Cavallo, B.Sc.

Re: Reef Expansion Project near Fighting Island

Dear Mr. Cavallo:

The project involving the expansion of the spawning reef near Fighting Island is one of great interest to Aamjiwnaang First Nation. The initial building of the spawning reef was successful as it is a man-made reef that the Lake Sturgeon have used and continue to use as a spawning area. This area has excellent conditions available for fish spawning for the Lake Sturgeon and other species as well. An expansion of this area would provide a larger area available for spawning to occur and further enhance reproduction and survival of the species in the traditional territory of Aamjiwnaang First Nation.

The sturgeon species is representative in the First Nations people's heritage and culture. It is an important piece represented as part of the Clan system. The sturgeon clan is very wise and was responsible for teaching the other clans. To the Anishinaabe people, the sturgeon stands for strength and depth. The sturgeon clan teachings include: Be thoughtful of the ancient ones, your ancestors. There is much wisdom from the past for this is where we can learn so much about life from others and their experiences. The survival of the species is very important to First Nations people as it represents wisdom so should the species die, the representation of wisdom also dies. Wisdom is an important part of the Seven Grandfather teachings amongst First Nations peoples.

The sturgeon has also provided many traditional uses for and by First Nation peoples. Some examples include flesh for food, oil for medicinal purposes, bones for needles, spears or arrowheads, drum coverings and glue or paint. Celebrations also were held at spawning events as important social gatherings where religious ceremonies and traditional teachings would occur.

Aamjiwnaang First Nation supports the expansion of the spawning reef project near Fighting Island and would be appreciative of Goderich Management Port Corporation (GMPC) also supporting the project as part of the Goderich Harbour Wharf Expansion Fish Habitat Compensation Strategy.

If you have any questions, please feel free to contact me.

Sincerely,

Sharilyn Johnston
Environmental Coordinator
Aamjiwnaang First Nation
sjohnston@aamjiwnaang.ca

APPENDIX C. COORDINATION WITH THE STATE HISTORIC PRESERVATION OFFICE

- Concurrence letter for all reef areas described in EA. Figures 9, 10, 12, 13, 14 were provided to the State Historic Preservation Office for review in fall of 2013.

STATE OF MICHIGAN
MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY
STATE HISTORIC PRESERVATION OFFICE

RICK SNYDER
GOVERNOR

SCOTT WOOSLEY
EXECUTIVE DIRECTOR

January 28, 2014

DR BRUCE MANNY
USGS GREAT LAKES SCIENCE CENTER
1451 GREEN ROAD
ANN ARBOR MI 48105

RE: ER13-546 The Restoration of Fish Spawning Habitat Project in the Huron Erie Corridor, City of Detroit & St Clair Township, Wayne & St Clair Counties (USGS)

Dear Dr. Manny,

Under the authority of Section 106 of the National Historic Preservation Act of 1966, amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

This letter evidences the USGS's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the USGS's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected." **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Specialist, at (517) 335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian G. Grennell
Cultural Resource Management Specialist

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG:sb

Copy: Douglas Denison, SmithGroupJJR

APPENDIX D. PERMITS

- MDEQ Permit for the Pointe Aux Chenes Reef
- USACE Permit for the Pointe Aux Chenes Reef
- MDEQ Permit for the Harts Light Reef
- USACE Permit for the Harts Light Reef

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
PERMIT

ISSUED TO:

Attn: Mr. Doug Alexander
City of Algonac
805 St. Clair River Drive
P.O. Box 454
Algonac, MI 48001

Permit No.	13-74-0101-P
Issued	August 23, 2013
Extended	
Revised	
Expires	August 23, 2018

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ) under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and specifically:

- ☒ **Part 301, Inland Lakes and Streams**
- ☐ **Part 315, Dam Safety**
- ☐ **Part 325, Great Lakes Submerged Lands**
- ☐ **Part 323, Shorelands Protection and Management**
- ☐ **Part 303, Wetlands Protection**
- ☐ **Part 353, Sand Dunes Protection and Management**
- ☐ **Part 31, Floodplain/Water Resources Protection**

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Permitted Activity:

Construct a fish spawning reef offshore of Riverfront Park, otherwise known as Pointe Aux Chenes, in the City of Algonac. Place approximately 9,681 cubic yards of 4 to 8 inch diameter limestone in an area measuring 525 feet long by 248 feet wide by 2 feet deep on the bottomlands of the St. Clair River. All work shall be completed in accordance with the attached plans and conditions of this permit.

Water Course Affected: St. Clair River
Property Location: St Clair **County,** City of Algonac, **Section** 10
Subdivision, Lot **Town/Range** 2N, 16E **Property Tax No.** 74-01-110-0012-000

Authority granted by this permit is subject to the following limitations:

A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31, Water Resources Protection, of the NREPA.
C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with Act 53 of the Public Act of 1974 and comply with each of the requirements of that Act.
G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
I. Permittee shall notify the MDEQ within one week after the completion of the activity authorized by this permit, by completing and forwarding the attached preaddressed postcard to the office addressed thereon.
J. This permit shall not be assigned or transferred without the written approval of the MDEQ.

K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31, and wetland).
M. In issuing this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the State (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the State and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, the MDEQ may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
Q. This permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to the MDEQ to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties which includes all the above information may be provided to the MDEQ. The MDEQ will review the request and if approved, will provide written notification to the new owner.
R. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.
S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
T. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent.
U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.
V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
W. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the waterbody are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the MDNR, Fisheries Division.
Y. Work to be done under authority of this permit is further subject to the following special instructions and specifications:

1. Authority granted by this permit does not waive any jurisdiction of the United States Army Corps of Engineers or the need for a federal permit, if required. For more information on USACE jurisdiction please contact Mr. Stanley F. Cowton, Jr. at Stanley.F.Cowton@usace.army.mil or 313-226-2219.

2. All fill shall consist of clean, washed rock or stone that is free of fines, other soil materials, any contaminants, or pollutants.

3. Fish habitat structures shall be placed in such a manner as to prevent hazards to navigation.

4. In accordance with the requirements of the United States Coast Guard, should it become necessary to allow watercraft to pass through the project area at any time during the authorized construction, then appropriate measures shall be taken to allow for watercraft passage.

5. Notification shall be made to the United States Coast Guard, 30 days prior to starting the project. Notify: United States Coast Guard, 9th Coast Guard District, 1240 East Ninth Street, Cleveland, Ohio, 44199-2060; Attention: O.B.R.

6. The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive the permittee's obligation to acquire any local, county, state or federal approval or authorization, necessary to conduct the activity.

7. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the MDEQ, will be for a five-year period beginning at the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.

Should you require further information regarding this permit you can contact Katie Fairchild in writing at MDEQ, Water Resources Division, Resources Unit, 27700 Donald Court, Warren, Michigan, 48092-2793, by e-mail at fairchildk@michigan.gov, or by phone at 586-753-3864.

By: Kat Fairchild

Katie Fairchild
Water Resources Division

cc: USACE (File No. LRE-2013-00487-12)
Clay Township Clerk
Beth Wenner, Regents of the University of Michigan
Paul Evanoff, SmithGroup JJR
Elizabeth Hay-Chmielewski, MDNR Fisheries Division
Melanie Foose, MDEQ - OGL

SMITHGROUPJJR 201 DEPOT STREET SECOND FLOOR ANN ARBOR MI 48104 734.662.4457 www.smithgroupjjr.com

GENERAL INFORMATION - PAC

DRAWING TITLE

PERMIT APPLICATION — CP-1

ISSUED WITH — DRAWING NUMBER

P:\50350.001\CAD\C\St Clare Reef\50632-St Clair Reef.dwg

DRAWING REFERENCE

POINTE AUX CHENES PROJECT
UNIVERSITY OF MICHIGAN/MICHIGAN SEA GRANT

PROJECT NAME

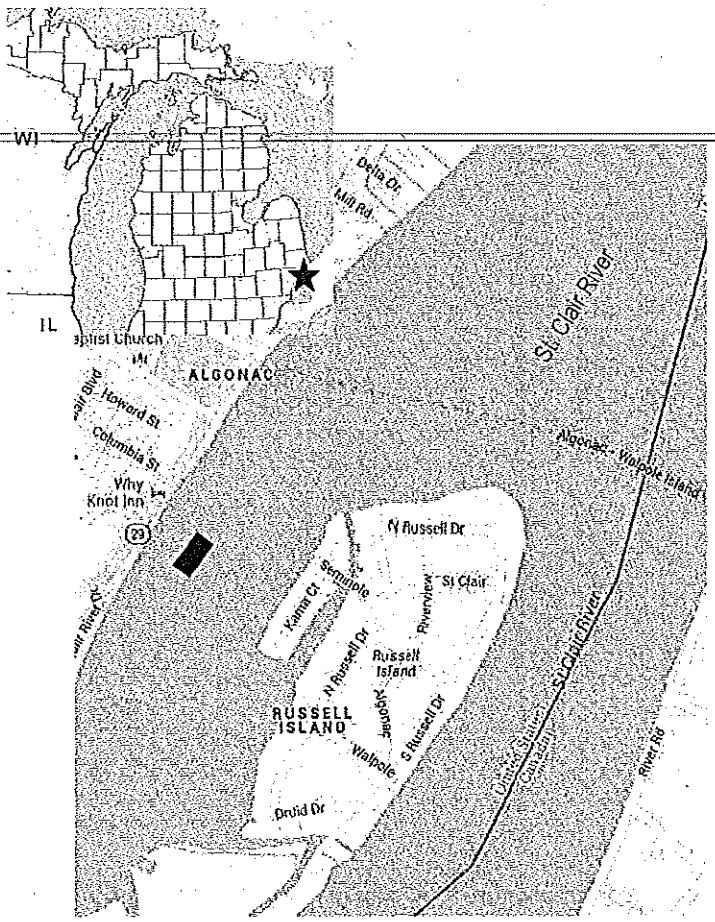
NOT TO SCALE

DRAWING SCALE

50350.001 — PROJECT NUMBER

7/9/2013 — DATE

PROJECT NORTH



1 LOCATION MAP
PLAN — NOT TO SCALE

NOTES:

1. BATHYMETRIC SURVEY DATA SUPPLIED BY THE U.S. GEOLOGICAL SURVEY. HORIZONTAL REFERENCE IS MICHIGAN STATE PLANE, SOUTH ZONE, INTERNATIONAL FEET. VERTICAL REFERENCE IS IGLD85, INTERNATIONAL FEET. THE WATER LEVEL (572.51', IGLD85) IS BASED ON WATER LEVEL MEASURED AT TIME OF SURVEY FROM 2000.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 02481.
3. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES CROSSINGS IN THE RIVER PRIOR TO COMMENCEMENT OF WORK.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND SERVICING LAND SIDE ACCESS POINTS FOR STAGING REEF CONSTRUCTION.
5. FINAL REEF LOCATIONS AND DIMENSIONS ARE PROPOSED AND COULD VARY DEPENDING ON COST OF MATERIAL, LAND OWNER PERMISSION AND PERMITTING.

DEQ-WRD-WRU
FILE# 13-74-0101-P
APPROVED PLANS
1 OF 3
SEMI DIST.

RECEIVED
JUL 11 2013
WRD/WRU
SEMI DIST.

FILE:P:\50350.001\CAD\C\St Clare Reef\50632-St. Clair Reef.dwg USER:rechtinow DATE:Jul, 09 2013 TIME: 02:53 pm

SMITHGROUP JJR
201 DEPOT STREET SECOND FLOOR ANN ARBOR MI 48104 734.662.4457 www.smithgroupjjr.com

REEF LOCATION PLAN - PAC

DRAWING TITLE

PERMIT APPLICATION

ISSUED WITH

CP-2

DRAWING NUMBER

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DRAWING REFERENCE

POINTE AUX CHENES PROJECT
UNIVERSITY OF MICHIGAN/MICHIGAN SEA GRANT

PROJECT NAME

AS SHOWN

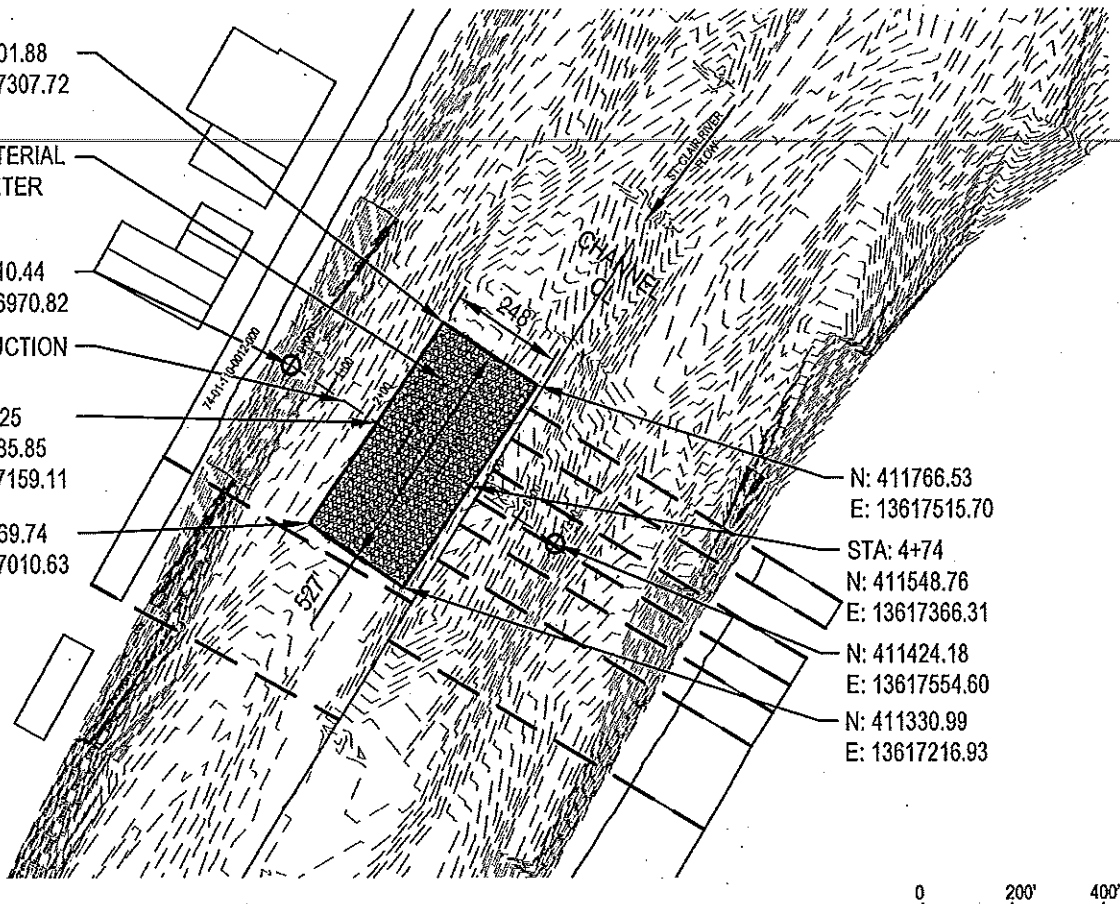
DRAWING SCALE

50350.001

PROJECT NUMBER

7/9/2013

DATE



2 REEF LOCATION PLAN

SCALE: 1"=400'

OEQ-WRD-WRU
FILE# 13-74-0101-P
APPROVED PLANS
2 OF 3
SEMI DIST.

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SMITHGROUP JJR
201 DEPOT STREET SECOND FLOOR ANN ARBOR MI 48104 734.662.4457 www.smithgroupjjr.com

REEF LOCATION PROFILE - PAC

DRAWING TITLE

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DRAWING REFERENCE

AS SHOWN

DRAWING SCALE

PERMIT APPLICATION

ISSUED WITH

CP-3

DRAWING NUMBER

POINTE AUX CHENES PROJECT
UNIVERSITY OF MICHIGAN/MICHIGAN SEA GRANT

PROJECT NAME

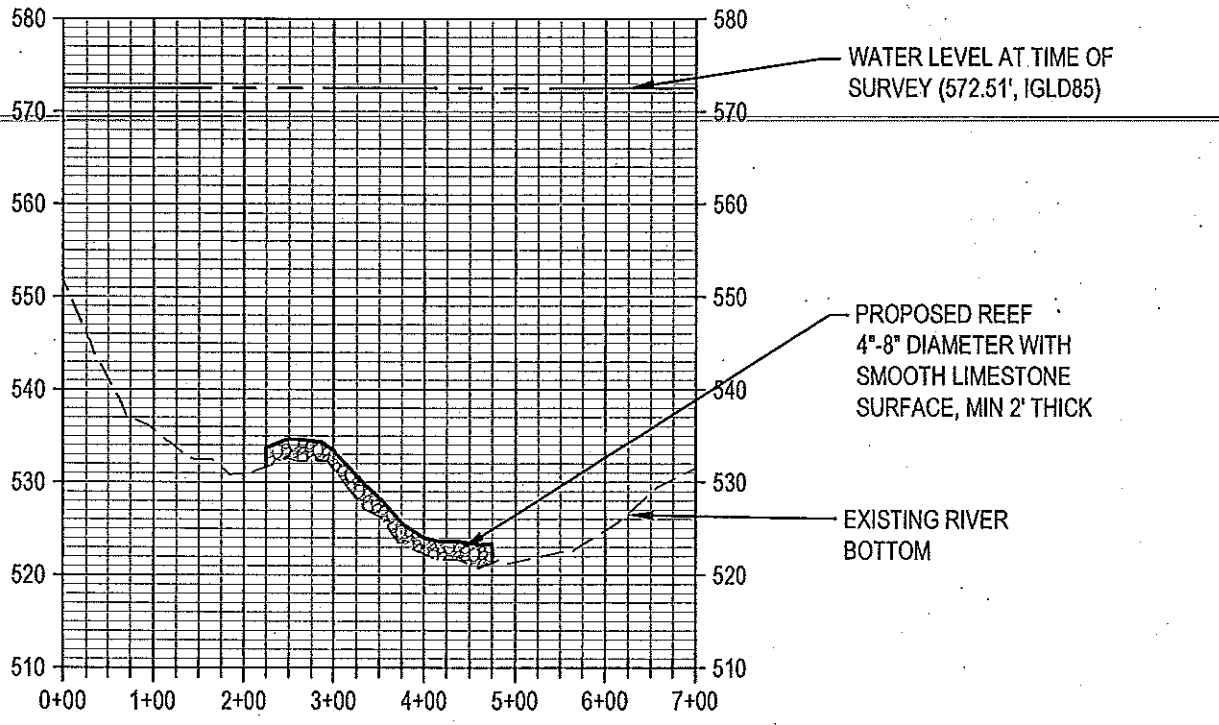
50350.001

PROJECT NUMBER

7/9/2013

DATE

PROJECT NORTH



0 100'/10' 200'/20'

3 REEF LOCATION
PROFILE

SCALE: 1"=200' HORIZ./1"=20' VERT.

DEQ-WRD-WRU
FILE#13-74-0101-P
APPROVED PLANS
3 OF 3
SEMI DIST.

RECEIVED
JUL 11 2013
WRD/WRU
SEMI DIST.

FILE: P:\50350.001\CAD\C\St Clare Reef\50632-St Clair Reef.dwg USER: rechtinow DATE: Jul, 09 2013 TIME: 02:53 pm

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
477 MICHIGAN AVENUE
DETROIT, MICHIGAN 48226-2550

REPLY TO
ATTENTION OF:

December 19, 2013

Engineering & Technical Services
Regulatory Office
File No. LRE-2013-00487-12

Peter Gerard
University of Michigan
Office of Contract Administration
5000 Wolverine Tower
3003 South State Street
Ann Arbor, Michigan 48109-1273

Dear Mr. Gerard:

We are enclosing Department of the Army Permit No. LRE-2013-00487-12. Any material changes in the location or plans of the work authorized herein must be submitted to the District Engineer prior to commencement of work. As required by law, the revised plans must have written approval of the Department of the Army.

Within 30 days of completion of the work, please furnish this office with certification that the artificial reef has been installed in compliance with the approved plans. The certification shall include a survey, conducted by a licensed surveyor, which clearly shows the elevation of the artificial reefs relative to low water datum (572.8 ft. IGLD 1985).

You are responsible for assuring that your contractor abides by the conditions of this permit. Should you have any questions on this matter, please contact Stanley Cowton at the above address, by E-Mail at Stanley.F.Cowton@usace.army.mil, or by telephone at 313-226-2219. In all communications, please refer to File Number LRE-2013-00487-12.

We are interested in your thoughts and opinions concerning your experience with the Detroit District, Corps of Engineers Regulatory Program. If you are interested in letting us know how we are doing, you can complete an electronic Customer Service Survey from our web site at: http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0 Or, you may contact us and request a paper copy of the survey that you may complete and return to us by mail or fax. Thank you for taking the time to complete the survey, we appreciate your feedback.

Sincerely,

John Konik
Chief, Regulatory Office
Engineering & Technical Services

Enclosures

Copy Furnished

Jennifer Read (University of Michigan Water Center),
Paul Evanoff (SmithGroupJJR)
MDEQ, 13-74-101
Enforcement
NOAA

DEPARTMENT OF THE ARMY PERMIT

Permittee University of Michigan

Permit No. LRE-2013-00487-12

Issuing Office U.S. Army Engineer District, Detroit

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

discharge approximately 9,700 cubic yards of angular limestone 4-8 inches in size, on an area of bottom measuring 527 x 248 feet (3.0 acres) at a minimum depth of 37.8 feet below the Low Water Datum elevation of 572.8 feet International Great Lakes Datum (IGLD) 1985 to create fish spawning habitat.

Project Location:

In the North Channel of the St. Clair River, offshore the City of Algonac, Michigan.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2016**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately stop work in that area and notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to

ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.
Special Conditions:

1. Your signature, as permittee, indicates that, as consideration for the issuance of this permit, you voluntarily accept and agree to comply with all of the terms and conditions of this permit.

2. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

Further Information:

1. Congressional Authorities: You have been so authorized to undertake the activity described above pursuant to:

Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act

2. Limits of this authorization.

a. This permit does not obviate the need to obtain Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modifications, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance of the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

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GENERAL INFORMATION - PAC

DRAWING TITLE

PERMIT APPLICATION

ISSUED WITH

CP-1

DRAWING NUMBER

P:\50350.001\CAD\C\St Clare Reef\50632-St Clair Reef.dwg

DRAWING REFERENCE

POINTE AUX CHENES PROJECT
UNIVERSITY OF MICHIGAN/MICHIGAN SEA GRANT

PROJECT NAME

NOT TO SCALE

DRAWING SCALE

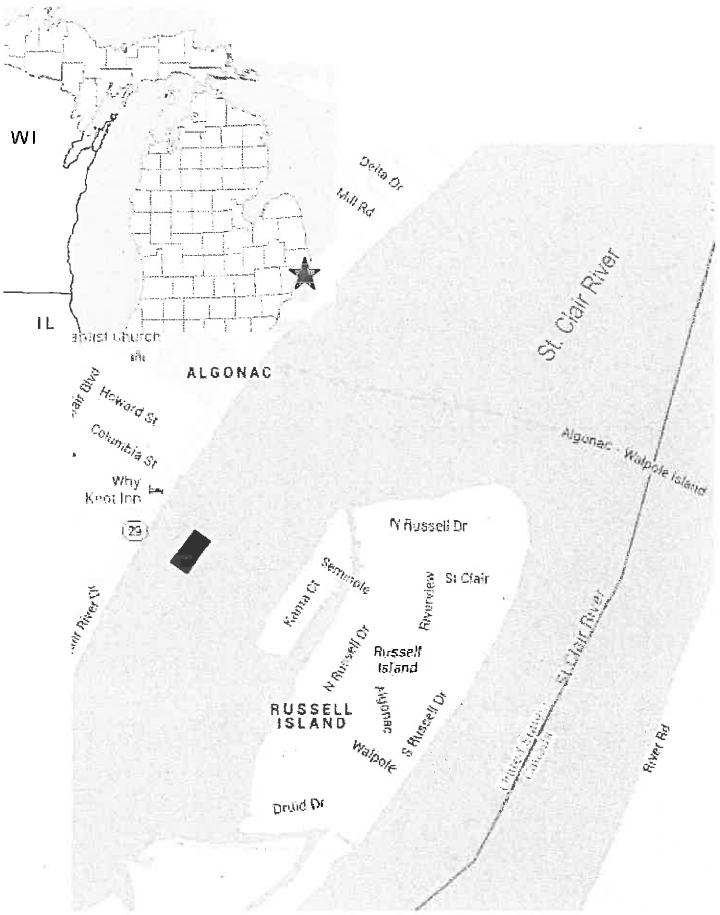
50350.001

PROJECT NUMBER

7/9/2013

DATE

PROJECT NORTH



1 LOCATION MAP
PLAN

NOT TO SCALE

NOTES:

1. BATHYMETRIC SURVEY DATA SUPPLIED BY THE U.S. GEOLOGICAL SURVEY. HORIZONTAL REFERENCE IS MICHIGAN STATE PLANE, SOUTH ZONE, INTERNATIONAL FEET. VERTICAL REFERENCE IS IGLD85, INTERNATIONAL FEET. THE WATER LEVEL (572.51', IGLD85) IS BASED ON WATER LEVEL MEASURED AT TIME OF SURVEY FROM 2000.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 02481.
3. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES CROSSINGS IN THE RIVER PRIOR TO COMMENCEMENT OF WORK.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND SERVICING LAND SIDE ACCESS POINTS FOR STAGING REEF CONSTRUCTION.
5. FINAL REEF LOCATIONS AND DIMENSIONS ARE PROPOSED AND COULD VARY DEPENDING ON COST OF MATERIAL, LAND OWNER PERMISSION AND PERMITTING.

FILE NUMBER: LRE-2013-00487-12/(13-74-0101-P)
Pte.Aux Chenes Spawning Reef
BY: Regents of the U of M
Algonac, St. Clair County, Michigan
SHEET 1 OF 3

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201 DEPOT STREET SECOND FLOOR ANN ARBOR MI 48104 734.662.4457 www.smithgroupjjr.com

REEF LOCATION PLAN - PAC

DRAWING TITLE

PERMIT APPLICATION — ISSUED WITH

CP-2 — DRAWING NUMBER

P:\50350.001\CAD\C\St Clare Reef\50632-St Clair Reef.dwg

DRAWING REFERENCE

POINTE AUX CHENES PROJECT
UNIVERSITY OF MICHIGAN/MICHIGAN SEA GRANT

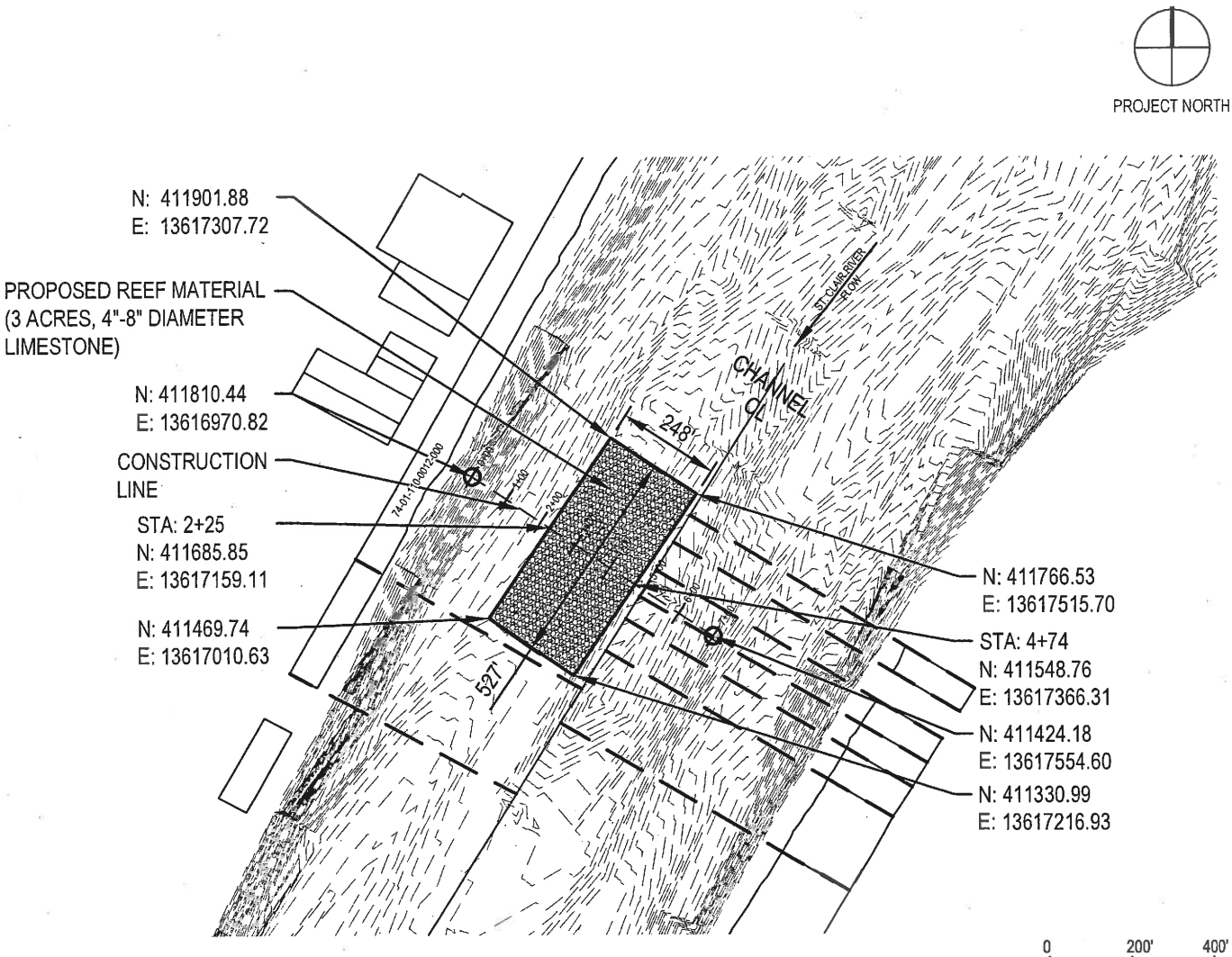
PROJECT NAME

AS SHOWN

DRAWING SCALE

50350.001 — PROJECT NUMBER

7/9/2013 — DATE



2 REEF LOCATION PLAN

SCALE: 1"=400'

FILE NUMBER: LRE-2013-00487-12/(13-74-0101-P)
Pte.Aux Chenes Spawning Reef
BY: Regents of the U of M
Algonac, St. Clair County, Michigan
SHEET 2 OF 3

FILE: P:\50350.001\CAD\C\St Clare Reef\50632-St Clair Reef.dwg USER:rechtinow DATE: Jul, 09 2013 TIME: 02:53 pm

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REEF LOCATION PROFILE - PAC

DRAWING TITLE

PERMIT APPLICATION — ISSUED WITH

CP-3 — DRAWING NUMBER

P:\50350.001\CAD\C\St Clare Reef\50632-St Clair Reef.dwg

DRAWING REFERENCE

POINTE AUX CHENES PROJECT
UNIVERSITY OF MICHIGAN/MICHIGAN SEA GRANT

PROJECT NAME

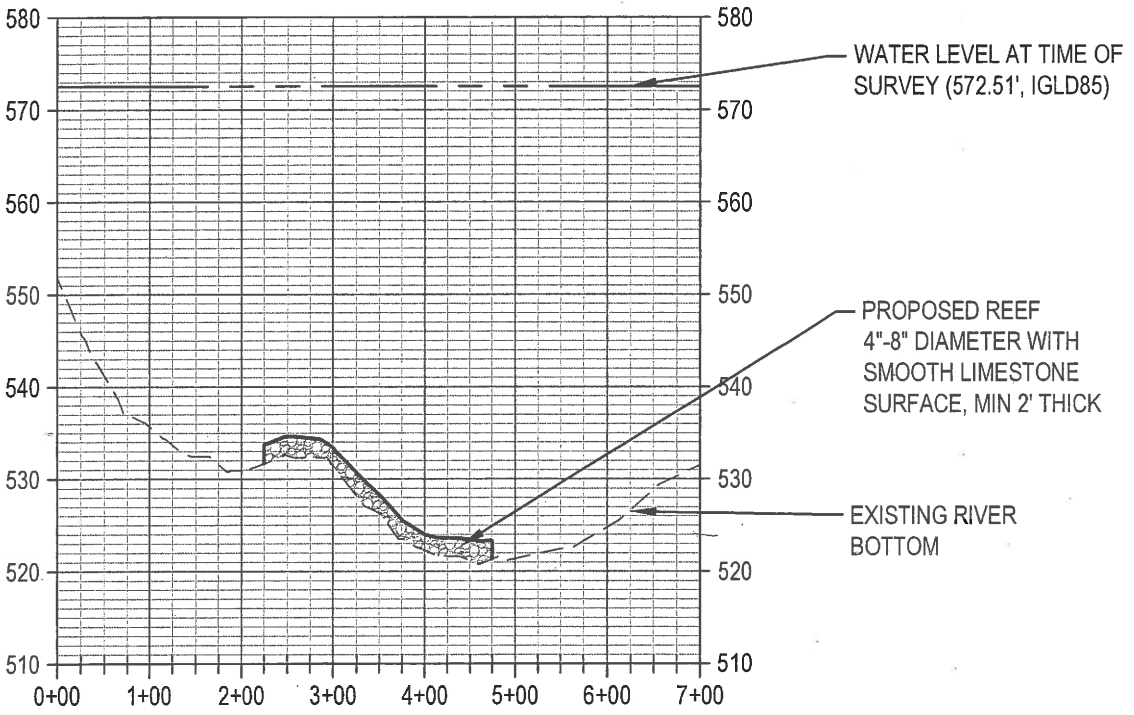
AS SHOWN

DRAWING SCALE

50350.001 — PROJECT NUMBER

7/9/2013 — DATE

PROJECT NORTH



0 100'/10' 200'/20'

3 REEF LOCATION PROFILE

SCALE: 1"=200' HORIZ./1"=20' VERT.

FILE NUMBER: LRE-2013-00487-12/(13-74-0101-P)
Pte.Aux Chenes Spawning Reef
BY: Regents of the U of M
Algonac, St. Clair County, Michigan
SHEET 3 OF 3

FILE:P:\50350.001\CAD\C\St Clare Reef\50632-St Clair Reef.dwg USER:rechtinow DATE: Jul, 09 2013 TIME: 02:53 pm

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

THE REGENTS OF THE UNIVERSITY OF MICHIGAN

(PERMITTEE) Peter J. Gerard
Associate Director
Grants and Contracts

12-13-13
(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

DEC 19 2013
(DATE)

John Konik for: (DISTRICT ENGINEER)
Robert J. Ells
Lieutenant Colonel, U.S. Army

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

STANDARD PERMIT COMPLETION REPORT

CELRE-RG-PE

Chief, Compliance and Enforcement Branch
Regulatory Office
U.S. Army Corps of Engineers
477 Michigan Avenue
Room 603
Detroit, MI 48226-2550

Dear Sir:

You are hereby notified that work under Department of the Army Permit No. LRE-2013-00487-12 to construct/restore fish spawning habitat in the North Channel of the St. Clair River at Algonac, St. Clair County, Michigan, issued to Beth Wenner was completed in accordance with the permit on:

_____.
(Date work completed)

_____
(Permittee's Signature)

IMPORTANT

1. This COMPLETION REPORT MUST BE MAILED to the above addressee within 10 days after completion of work covered by the FEDERAL PERMIT to insure an accurate Government record of data affecting navigation.

2. Where dredging soundings are made of projects which include dredging, a copy of the soundings should accompany this report. If the soundings are measured from the water surface and have not been corrected to International Great Lakes Datum plane, the hour and date soundings was made should be noted on sounding reports.

NOTE: Although permits authorizing structures carry an expiration date, REPAIRS that conform to the permit plans are also within the scope of the authorization. Therefore, it is recommended that expired permits NOT be destroyed, but retained as proof that the work to be repaired has received the Corps of Engineers' approval.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
PERMIT

ISSUED TO:

Regents of the University of Michigan
Attn: Beth Wenner
7071 Wolverine Tower
3003 South State Street
Ann Arbor, MI 48109

Permit No.	13-74-0149-P
Issued	January 28, 2014
Extended	
Revised	
Expires	January 28, 2019

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ) under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and specifically:

- ☒ **Part 301, Inland Lakes and Streams**
- ☐ **Part 315, Dam Safety**
- ☐ **Part 325, Great Lakes Submerged Lands**
- ☐ **Part 323, Shorelands Protection and Management**
- ☐ **Part 303, Wetlands Protection**
- ☐ **Part 353, Sand Dunes Protection and Management**
- ☐ **Part 31, Floodplain/Water Resources Protection**

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Permitted Activity:

Construct 2 fish spawning reefs offshore between 4189 River Road and 4287 River Road, otherwise known as Harts Light, in East China Township. Place approximately 13,053 cubic yards of 4 to 8 inch diameter limestone in an area measuring 798 feet long by 165 feet wide by 2 feet deep and a second area 270 feet long by 165 feet wide by 2 feet deep on the bottomlands of the St. Clair River. All work shall be completed in accordance with the attached plans and conditions of this permit.

Water Course Affected: St Clair River
Property Location: St Clair **County,** East China Township, **Section** 18
Subdivision, Lot **Town/Range** 4N, 17E **Property Tax No.**

Authority granted by this permit is subject to the following limitations:

A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31, Water Resources Protection, of the NREPA.
C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with Act 53 of the Public Act of 1974 and comply with each of the requirements of that Act.
G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
I. Permittee shall notify the MDEQ within one week after the completion of the activity authorized by this permit, by completing and forwarding the attached preaddressed postcard to the office addressed thereon.
J. This permit shall not be assigned or transferred without the written approval of the MDEQ.

K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31, and wetland).
M. In issuing this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the State (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the State and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, the MDEQ may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
Q. This permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to the MDEQ to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties which includes all the above information may be provided to the MDEQ. The MDEQ will review the request and if approved, will provide written notification to the new owner.
R. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.
S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
T. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent.
U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.
V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
W. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the waterbody are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the MDNR, Fisheries Division.
Y. Work to be done under authority of this permit is further subject to the following special instructions and specifications:

1. Authority granted by this permit does not waive any jurisdiction of the United States Army Corps of Engineers or the need for a federal permit, if required. For more information on USACE jurisdiction please contact Mr. Robert Morningstar at Robert.L.Morningstar@usace.army.mil or 313-226-2015.

2. All fill shall consist of clean, washed rock or stone that is free of fines, other soil materials, any contaminants, or pollutants.

3. Fish habitat structures shall be placed in such a manner as to prevent hazards to navigation.

4. In accordance with the requirements of the United States Coast Guard, should it become necessary to allow watercraft to pass through the project area at any time during the authorized construction, then appropriate measures shall be taken to allow for watercraft passage.

5. Notification shall be made to the United States Coast Guard, 30 days prior to starting the project. Notify: United States Coast Guard, 9th Coast Guard District, 1240 East Ninth Street, Cleveland, Ohio, 44199-2060; Attention: O.B.R.

6. The permittee is responsible for acquiring all necessary landowner permissions, easements, or rights-of-way before commencing any work authorized by this permit. All construction operations relating to or part of this project shall be confined to the existing landowner permissions, right-of-way limits, or other acquired easements.

7. This project shall be constructed as shown on the attached plans and riparian interest area estimate. The authorization for this project was based upon the receipt of written authorization(s) from the affected adjacent riparian owner(s). These written authorizations must be updated if the property ownership changes or the landowner revokes the authorization during the term of this permit.

8. The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive the permittee's obligation to acquire any local, county, state or federal approval or authorization, necessary to conduct the activity.

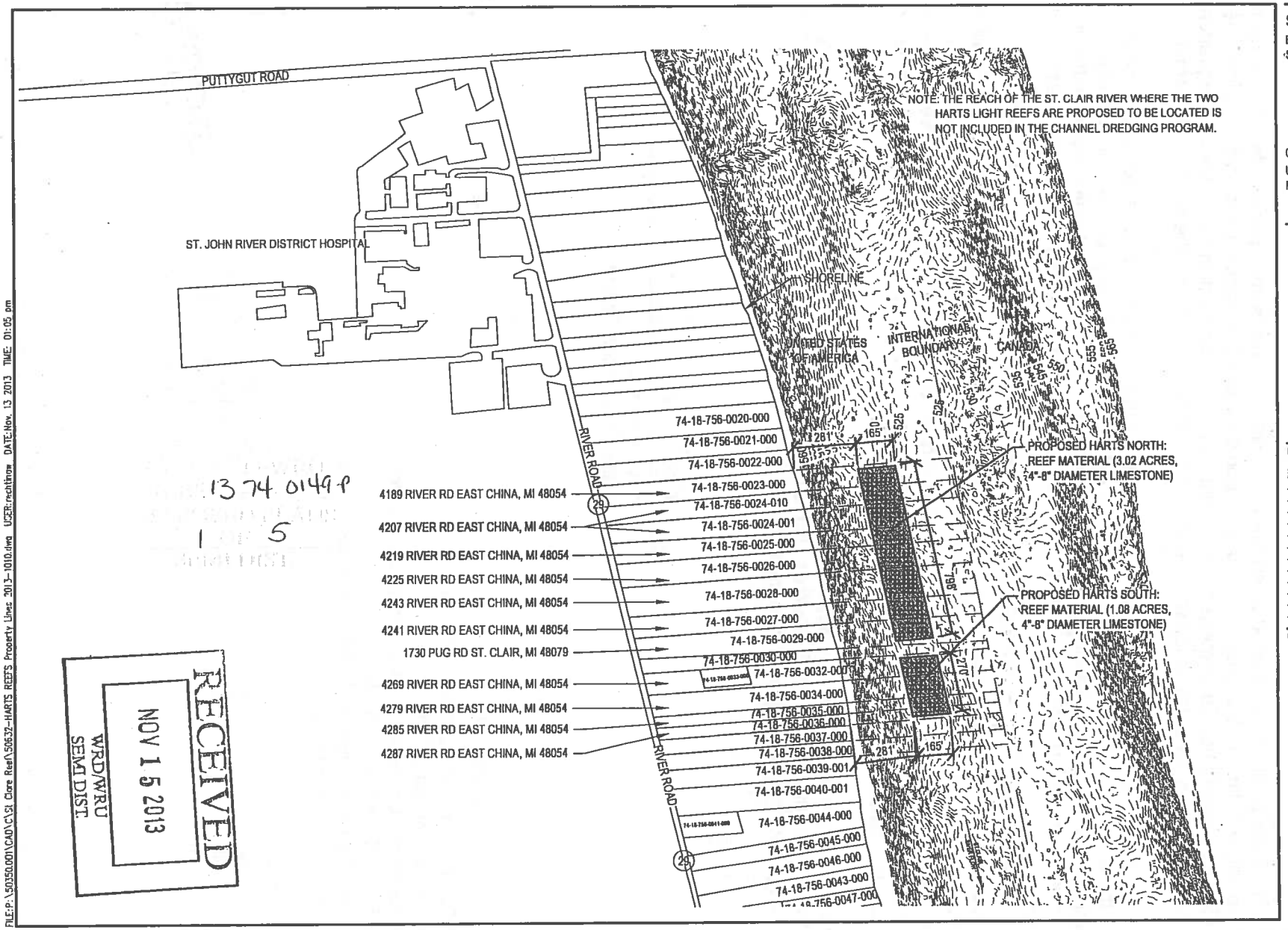
9. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the MDEQ, will be for a five-year period beginning at the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.

Should you require further information regarding this permit you may contact Katie Fairchild in writing at MDEQ, Water Resources Division, Resources Unit, 27700 Donald Court, Warren, Michigan, 48092-2793, by e-mail at fairchildk@michigan.gov, or by phone at 586-753-3864.

By: Kat Fairchild

Katie Fairchild
Water Resources Division

cc: USACE (File No. LRE-2013-00867-12)
East China Township Clerk
Jennifer Read, University of Michigan Water Center
Paul Evanoff, SmithGroup JJR
Elizabeth Hay-Chmielewski, MDNR Fisheries Division
Melanie Foose, MDEQ - OGL



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RECEIVED
NOV 15 2013
WRD/WRU
SEMI DIST.

FILE:P:\50350.001\CAD\CSI Core Reef\50632-HARTS REEFS Property Lines 2013-1010.dwg USER:rechtnow DATE:Nov. 13 2013 TIME: 01:05 pm

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

SMITHGROUPJJR

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/13/2013

DRAWING TITLE
HARTS LIGHT REEFS
LOCATION MAP

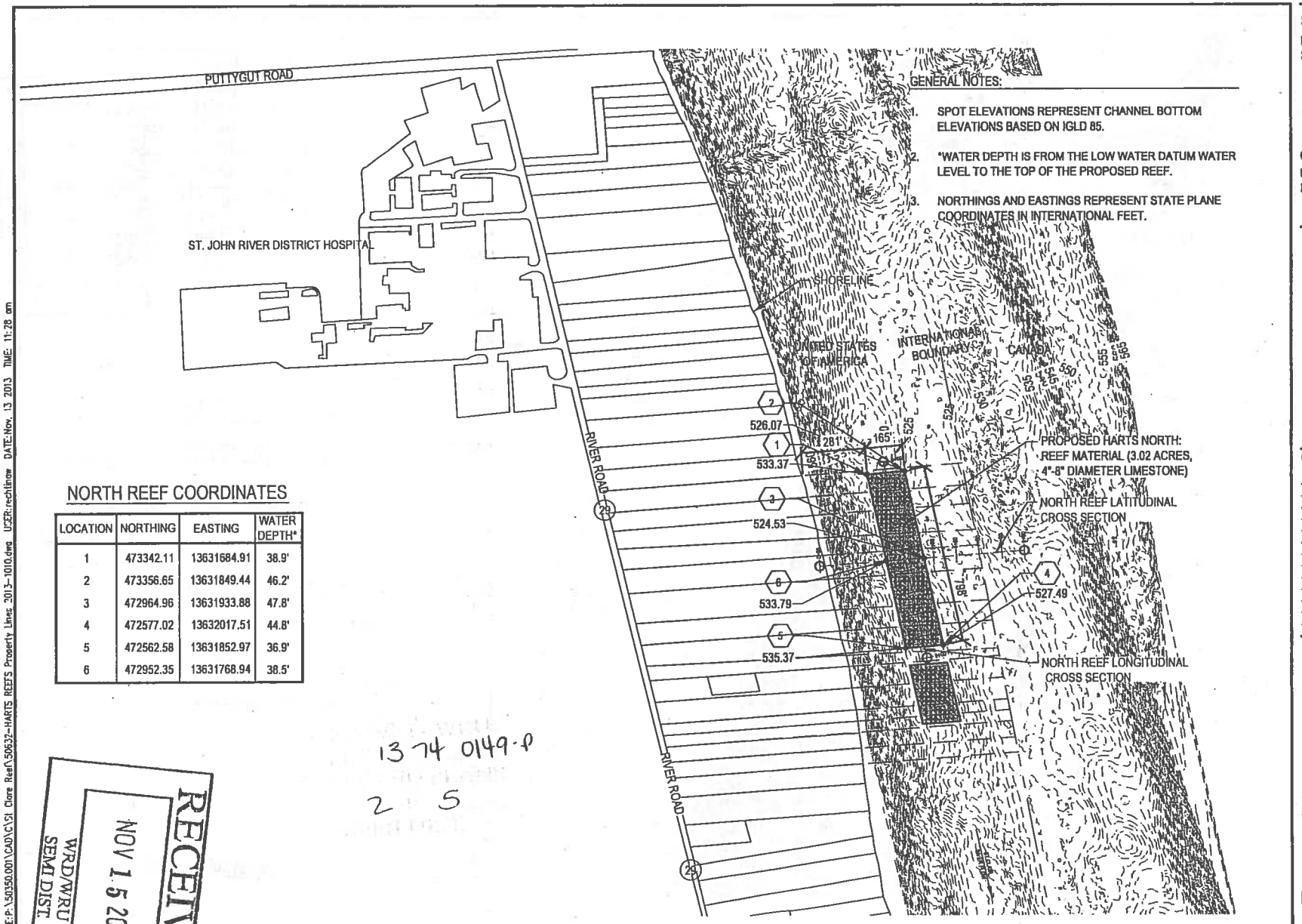
PROJECT NORTH

0 200' 400'
SCALE: 1"=400'

SCALE

50350.001
PROJECT NUMBER

FIGURE 1
DRAWING NUMBER



GENERAL NOTES:

1. SPOT ELEVATIONS REPRESENT CHANNEL BOTTOM ELEVATIONS BASED ON IGLD 85.
2. *WATER DEPTH IS FROM THE LOW WATER DATUM WATER LEVEL TO THE TOP OF THE PROPOSED REEF.
3. NORTHINGS AND EASTINGS REPRESENT STATE PLANE COORDINATES IN INTERNATIONAL FEET.

NORTH REEF COORDINATES

LOCATION	NORTHING	EASTING	WATER DEPTH*
1	473342.11	13631684.91	38.9'
2	473356.65	13631849.44	46.2'
3	472964.96	13631933.88	47.8'
4	472577.02	13632017.51	44.8'
5	472562.58	13631852.97	36.9'
6	472952.35	13631768.94	38.5'

13 74 0149-P
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RECEIVED
NOV 15 2013
WRD/WRU
SEMI DIST.

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

SMITHGROUP JJR
201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/13/2013

DRAWING TITLE
HARTS LIGHT
NORTH REEF PLAN

PROJECT NORTH

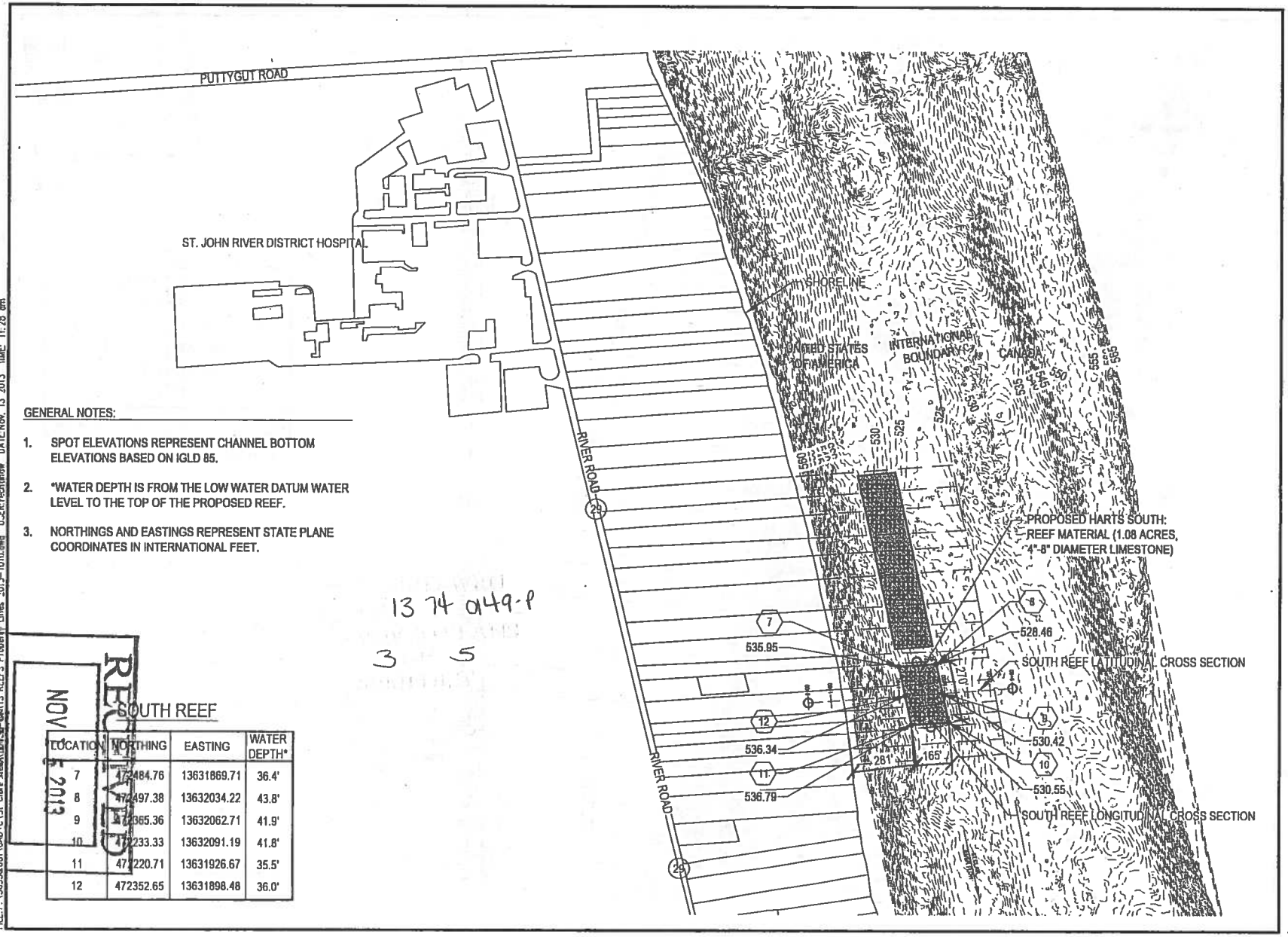
0 200' 400'
SCALE: 1"=400'

SCALE

50350.001
PROJECT NUMBER

FIGURE 2
DRAWING NUMBER

FILE:P:\50350.001\CAD\C\GI Clare Reef\50632-HARTS REEFS Property Lines 2013-1010.dwg USER:rechtinow DATE:Nov. 13, 2013 TIME: 11:28 am



GENERAL NOTES:

1. SPOT ELEVATIONS REPRESENT CHANNEL BOTTOM ELEVATIONS BASED ON IGLD 85.
2. *WATER DEPTH IS FROM THE LOW WATER DATUM WATER LEVEL TO THE TOP OF THE PROPOSED REEF.
3. NORTHINGS AND EASTINGS REPRESENT STATE PLANE COORDINATES IN INTERNATIONAL FEET.

13 74 049-P

3 5

SOUTH REEF

LOCATION	NORTHING	EASTING	WATER DEPTH*
7	472484.76	13631869.71	36.4'
8	472497.38	13632034.22	43.8'
9	472365.36	13632062.71	41.9'
10	472233.33	13632091.19	41.8'
11	472220.71	13631926.67	35.5'
12	472352.65	13631898.48	36.0'

RECEIVED
NOV 5 2013
SEMCOG DIST.

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ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

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SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/13/2013

DRAWING TITLE
HARTS LIGHT
SOUTH REEF PLAN

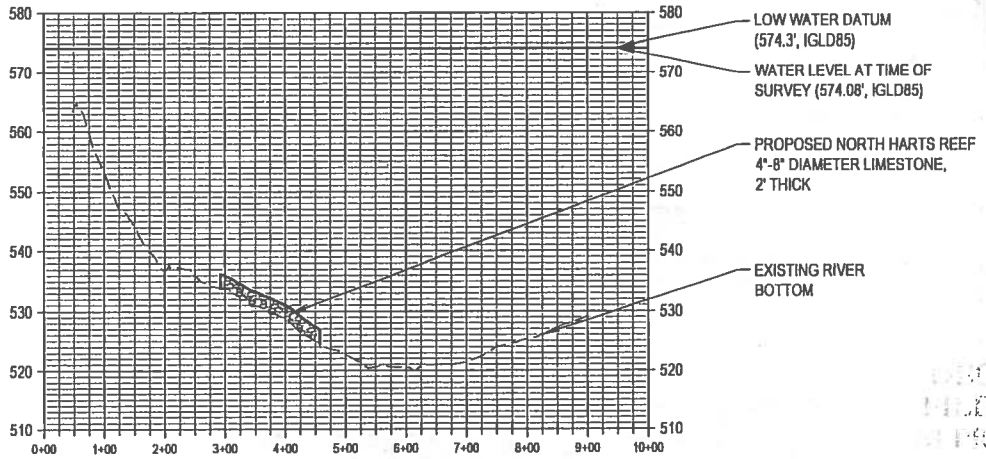
PROJECT NORTH

0 200' 400'
SCALE: 1"=400'

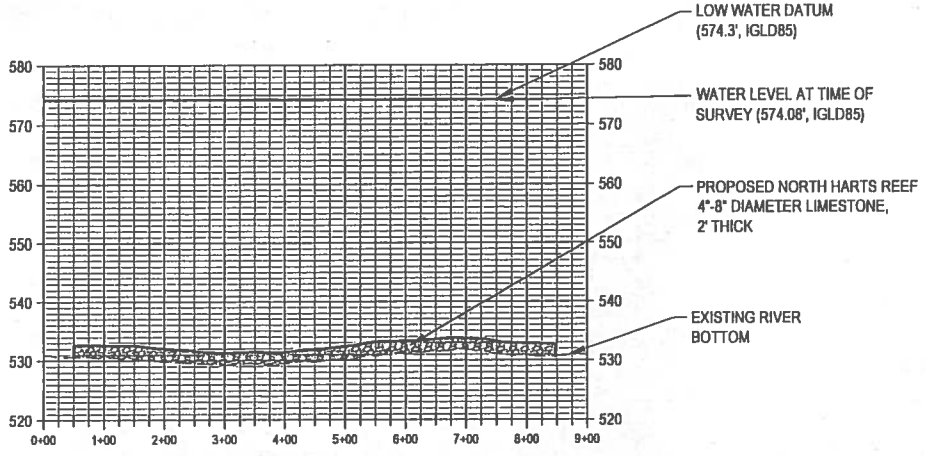
SCALE

50350.001
PROJECT NUMBER

FIGURE 3
DRAWING NUMBER



1 NORTH REEF LATITUDINAL CROSS SECTION
PROFILE



2 NORTH REEF LONGITUDINAL CROSS SECTION
PROFILE

2-WRD-WRU
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PROVIDED PLANS
4 OF 5
BERM TEST

RECEIVED
NOV 15 2013
WRD/WRU
SEMI DIST.

FILE:P:\50350.001\CAD\C\SI Clare Reef\50632-HARTS REEFS Property Lines 2013-1010.dwg USER:rechlinow DATE:Nov. 12 2013 TIME: 01:46 pm

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

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201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/13/2013

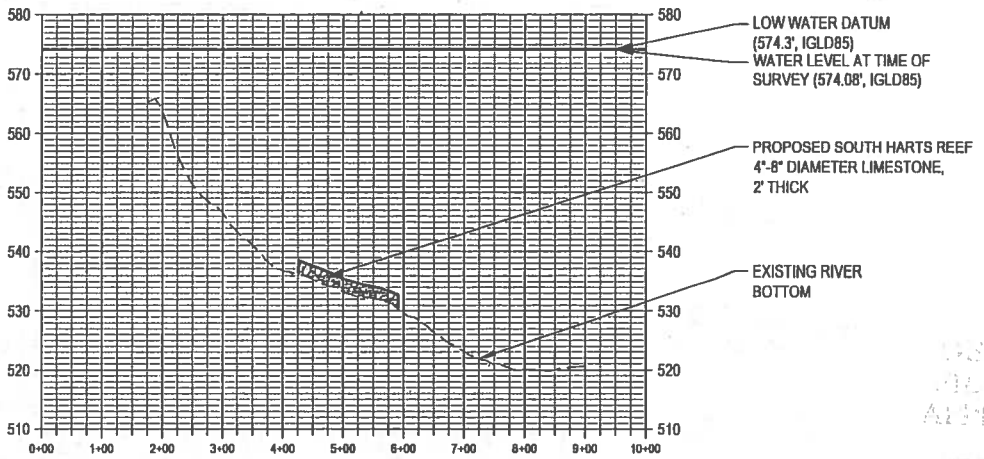
DRAWING TITLE
HARTS LIGHT NORTH
REEF PROFILES

PROJECT NORTH
0 100'/10' 200'/20'

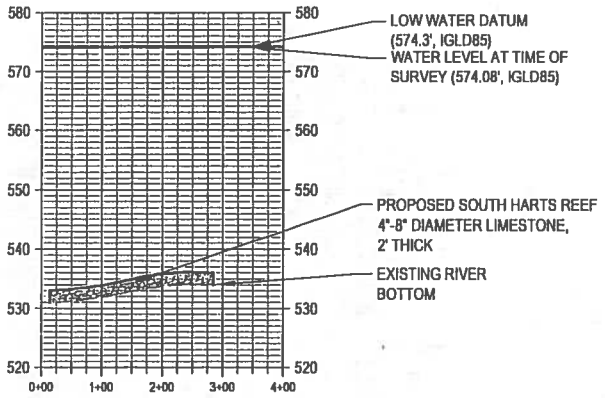
SCALE: 1"=200' HORIZ./1"=20' VERT.
SCALE

50350.001
PROJECT NUMBER

FIGURE 4
DRAWING NUMBER



1 SOUTH REEF LATITUDINAL CROSS SECTION
PROFILE



2 SOUTH REEF LONGITUDINAL CROSS SECTION
PROFILE

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

SMITHGROUP JJR
201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/13/2013

DRAWING TITLE
HARTS LIGHT SOUTH REEF PROFILES

PROJECT NORTH

0 100'/10' 200'/20'

SCALE: 1"=200' HORIZ./1"=20' VERT.
SCALE

50350.001
PROJECT NUMBER

FIGURE 5
DRAWING NUMBER

Draft

DEPARTMENT OF THE ARMY PERMIT

Permittee Regents of the University of Michigan

Permit No. LRE-2013-00867-12

Issuing Office U.S. Army Engineer District, Detroit

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

Discharge a combined total of approximately 13,100 cubic yards of 4 to 8 inch quarried limestone rock in two adjacent areas measuring 798 feet by 165 feet and 270 feet by 165 feet. The stone is to be placed a maximum of two (2) feet thick. The north reef is to be constructed to not exceed an elevation of 36.9 feet below the Low Water Datum (LWD) elevation of 574.3 feet International Great Lakes Datum (IGLD) 1985 and the southern reef is to be constructed not to exceed an elevation of 35.5 feet below LWD.

Project Location:

In the St. Clair River, offshore properties located on River Road, East China Township, St. Clair County, Michigan (T4N, 17E, Section 18).

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2017**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately stop work in that area and notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

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4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. Your signature, as permittee, indicates that, as consideration for the issuance of this permit, you voluntarily accept and agree to comply with all of the terms and conditions of this permit.

2. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

3. Within 30 days of completion of the work, the permittee must furnish this office with certification that the artificial reefs have been installed in compliance with the approved plans. The certification shall include a survey, conducted by a licensed surveyor, which clearly shows the elevation of the artificial reefs relative to low water datum (574.3 IGLD 1985).

4. The permittee shall contact the U.S. Coast Guard in writing, a minimum of 14 days prior to the start of work, and request that a notice to mariners be published. The permittee shall provide this office a concurrent copy of their request.

5. The permittee shall contact the U.S. Coast Guard to determine whether installation of navigational lighting is required.

6. The structures and appurtenances authorized herein are located within the authorized Federal channel limits. The permittee is responsible for the removal of any structures and appurtenances that interfere with Federal dredging or other maintenance activities on the channel.

7. The permittee, associated teams members, agents and/or contractors, understand and agree to move their vessels to yield to commercial vessels if requested.

Further Information:

1. Congressional Authorities: You have been so authorized to undertake the activity described above pursuant to:

Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

2. Limits of this authorization.

a. This permit does not obviate the need to obtain Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modifications, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance of the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective

Draft

measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

_____ _____

(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

_____ _____

Wally Gauthier for: (DATE)
(DISTRICT ENGINEER)
Robert J. Ells
Lieutenant Colonel, U.S. Army

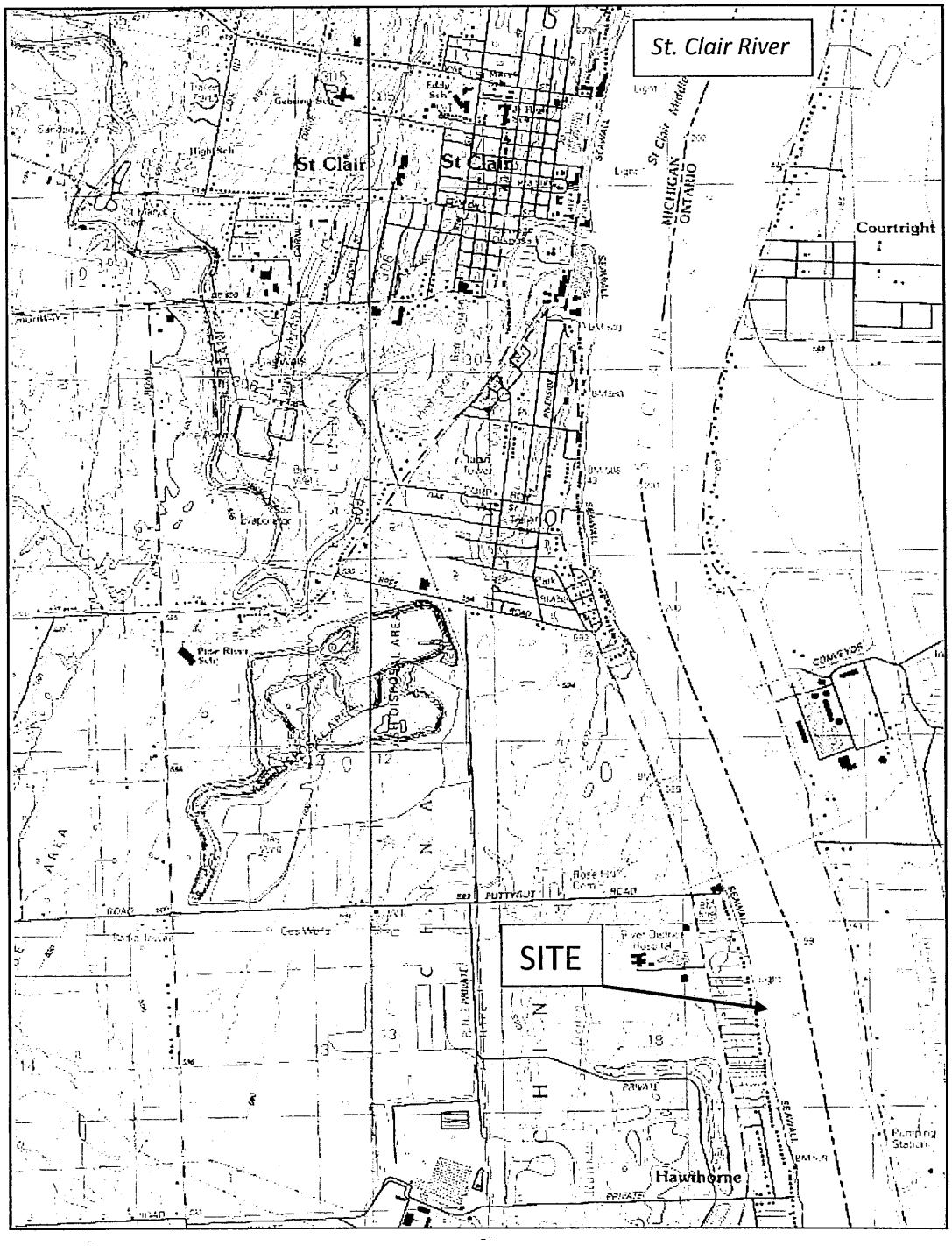
When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

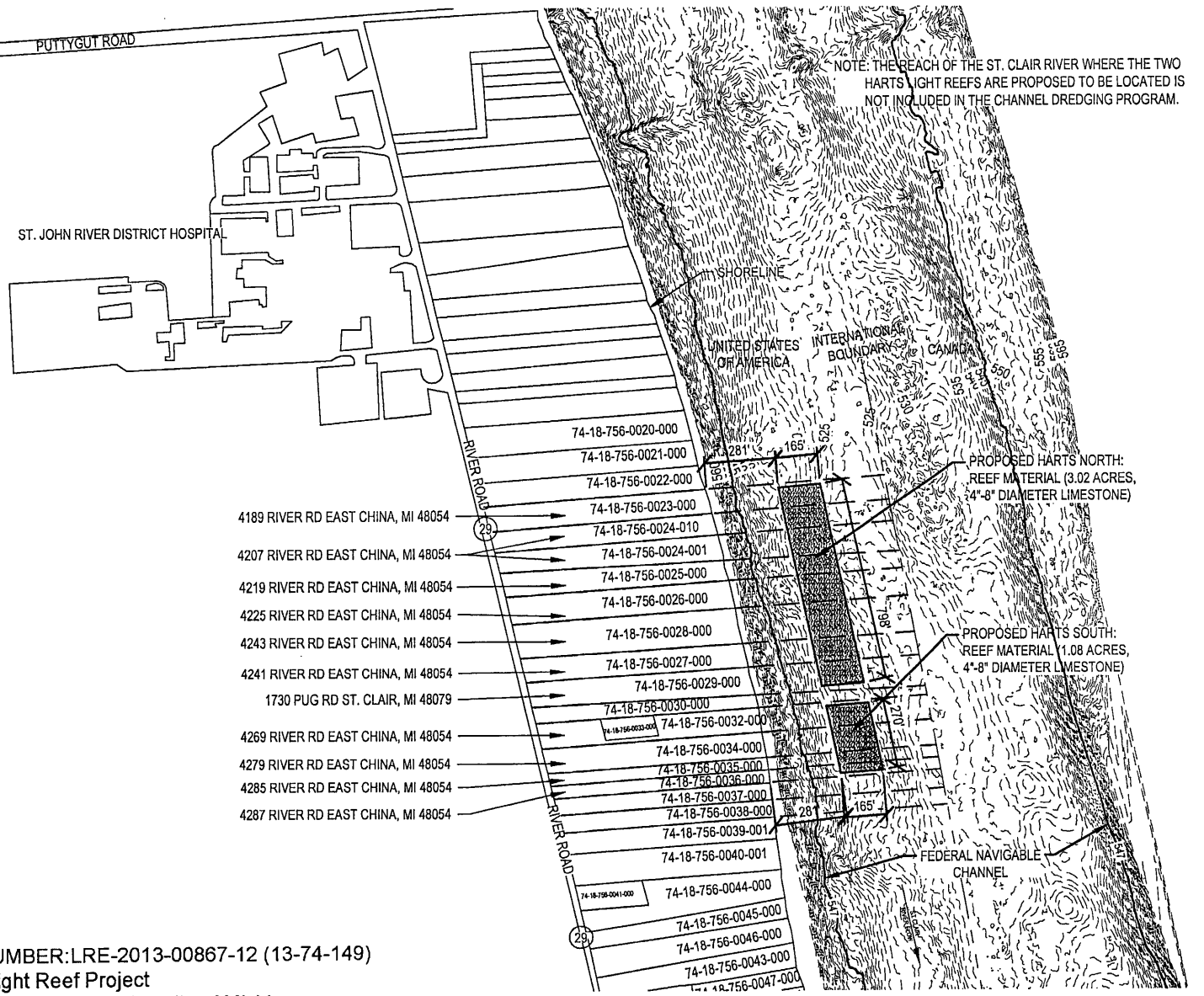
(TRANSFEREE) (DATE)

SITE LOCATION MAP

Hart's Light Site
St. Clair River
East China Township, Michigan



FILE NUMBER:LRE-2013-00867-12 (13-74-149)
Hart's Light Reef Project
BY: Regents of the University of Michigan
St. Clair River
East China, St. Clair County, Michigan
SHEET 1 OF 6



FILE NUMBER:LRE-2013-00867-12 (13-74-149)
Hart's Light Reef Project
BY: Regents of the University of Michigan
St. Clair River
East China, St. Clair County, Michigan
SHEET 2 OF 6

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

SMITHGROUP JJR

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/12/2013
PERMITTING-USACE	01/21/2014

DRAWING TITLE
HARTS LIGHT REEFS
LOCATION MAP

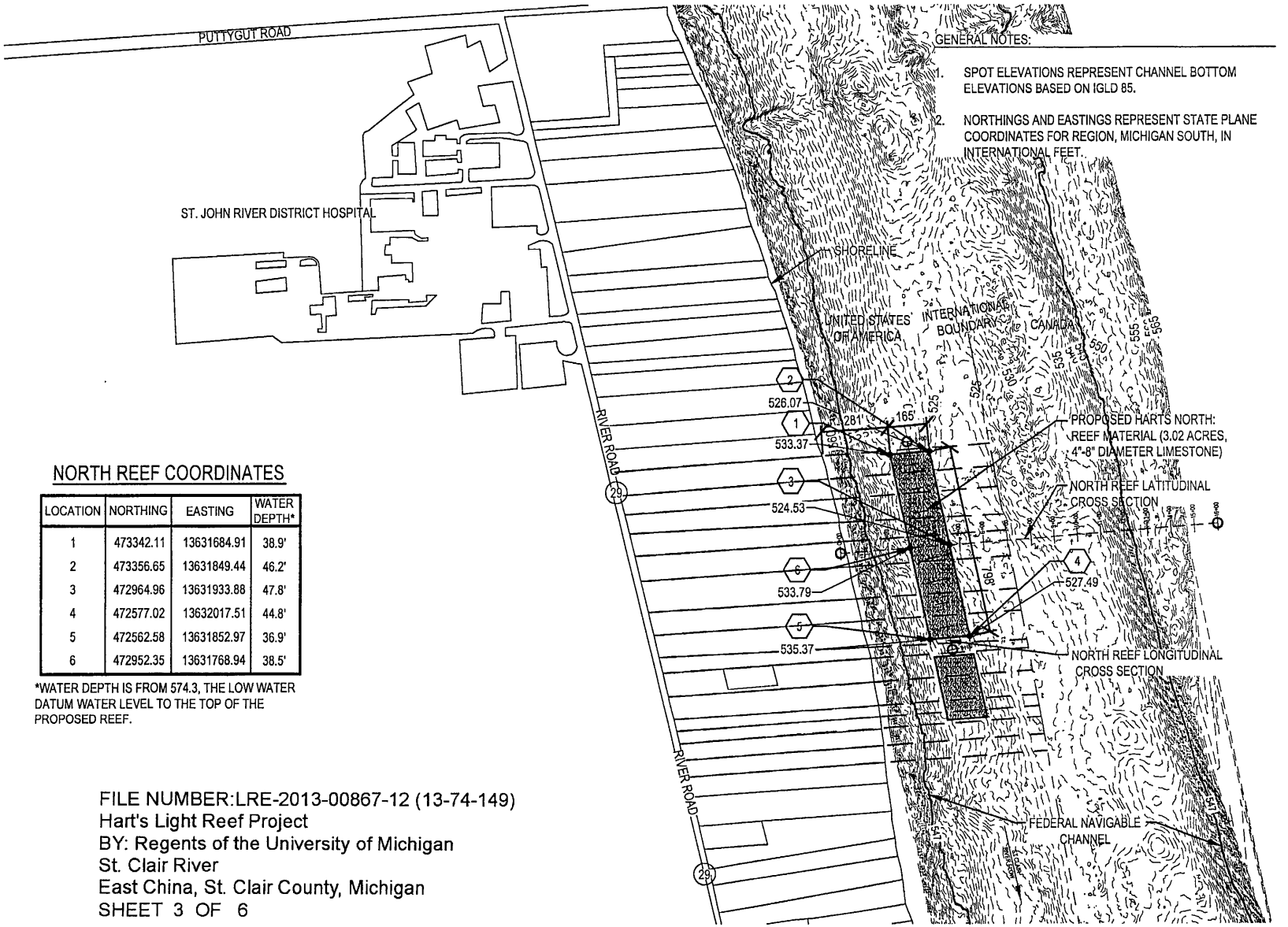
PROJECT NORTH

0 200' 400'
SCALE: 1"=400'

SCALE

50350.001
PROJECT NUMBER

FIGURE 1
DRAWING NUMBER



GENERAL NOTES:

1. SPOT ELEVATIONS REPRESENT CHANNEL BOTTOM ELEVATIONS BASED ON IGLD 85.
2. NORTHINGS AND EASTINGS REPRESENT STATE PLANE COORDINATES FOR REGION, MICHIGAN SOUTH, IN INTERNATIONAL FEET.

NORTH REEF COORDINATES

LOCATION	NORTHING	EASTING	WATER DEPTH*
1	473342.11	13631684.91	38.9'
2	473356.65	13631849.44	46.2'
3	472964.96	13631933.88	47.8'
4	472577.02	13632017.51	44.8'
5	472562.58	13631852.97	36.9'
6	472952.35	13631768.94	38.5'

*WATER DEPTH IS FROM 574.3, THE LOW WATER DATUM WATER LEVEL TO THE TOP OF THE PROPOSED REEF.

FILE NUMBER:LRE-2013-00867-12 (13-74-149)
Hart's Light Reef Project
BY: Regents of the University of Michigan
St. Clair River
East China, St. Clair County, Michigan
SHEET 3 OF 6

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

SMITHGROUPJJR
201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/12/2013
PERMITTING-USACE	01/21/2014

DRAWING TITLE
HARTS LIGHT
NORTH REEF PLAN

PROJECT NORTH

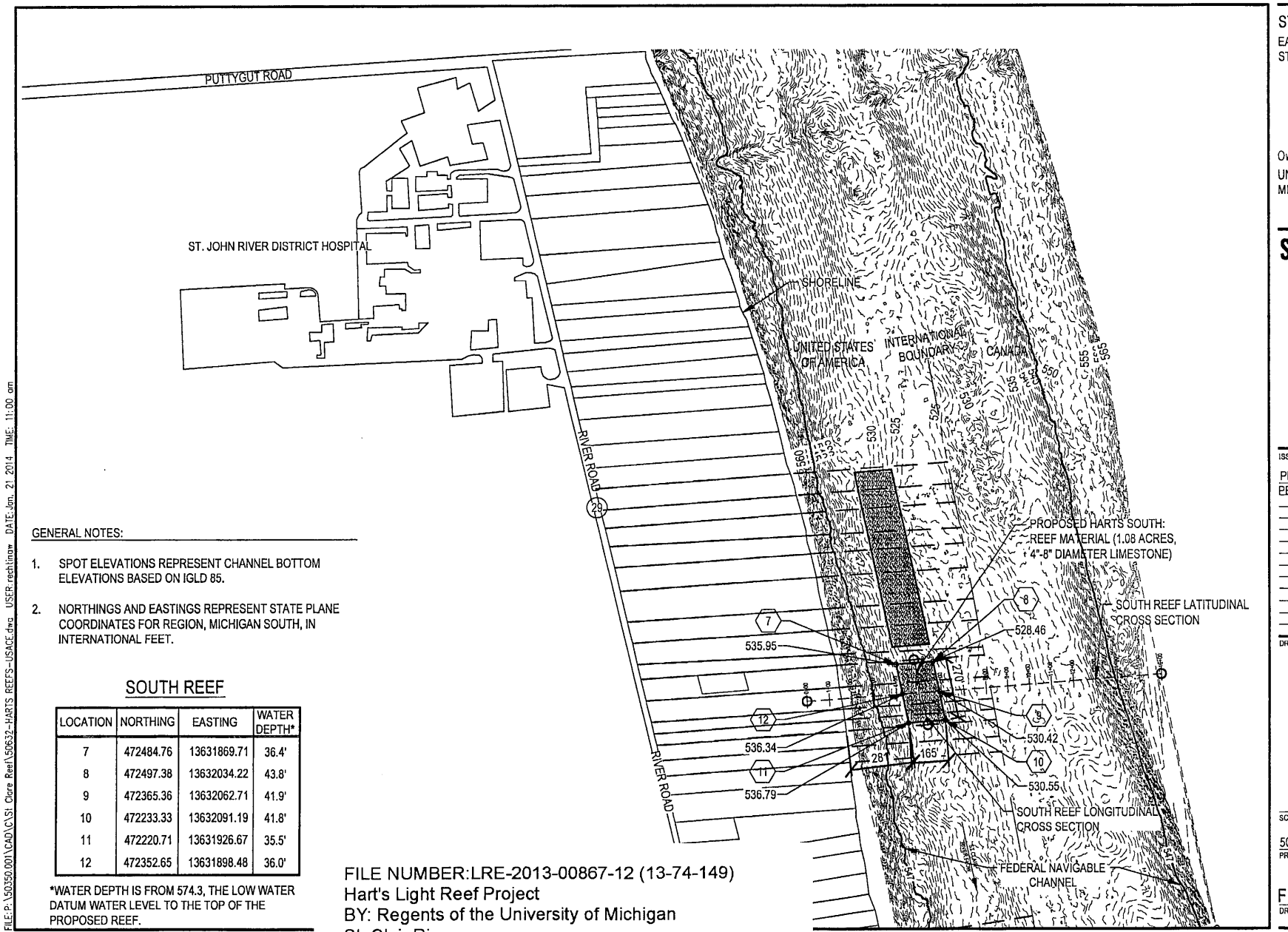
0 200' 400'
SCALE: 1"=400'

SCALE

50350.001
PROJECT NUMBER

FIGURE 2
DRAWING NUMBER

FILE:P:\50350.001\CAD\CS\St Clare Reef\50632-HARTS REEFS-USACE.dwg USER:rechtinow DATE: Jan. 21 2014 TIME: 11:00 am



GENERAL NOTES:

1. SPOT ELEVATIONS REPRESENT CHANNEL BOTTOM ELEVATIONS BASED ON IGLD 85.
2. NORTHINGS AND EASTINGS REPRESENT STATE PLANE COORDINATES FOR REGION, MICHIGAN SOUTH, IN INTERNATIONAL FEET.

SOUTH REEF

LOCATION	NORTHING	EASTING	WATER DEPTH*
7	472484.76	13631869.71	36.4'
8	472497.38	13632034.22	43.8'
9	472365.36	13632062.71	41.9'
10	472233.33	13632091.19	41.8'
11	472220.71	13631926.67	35.5'
12	472352.65	13631898.48	36.0'

*WATER DEPTH IS FROM 574.3, THE LOW WATER DATUM WATER LEVEL TO THE TOP OF THE PROPOSED REEF.

FILE NUMBER:LRE-2013-00867-12 (13-74-149)
Hart's Light Reef Project
BY: Regents of the University of Michigan
St. Clair River
East China, St. Clair County, Michigan
SHEET 4 OF 6

FILE: P:\50350.001\CAD\C\St Clare Reef\50632-HARTS REEFS-USACE.dwg USER: rechtinow DATE: Jan. 21 2014 TIME: 11:00 am

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

SMITHGROUPJJR
201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/12/2013
PERMITTING-USACE	01/21/2014

DRAWING TITLE
HARTS LIGHT
SOUTH REEF PLAN

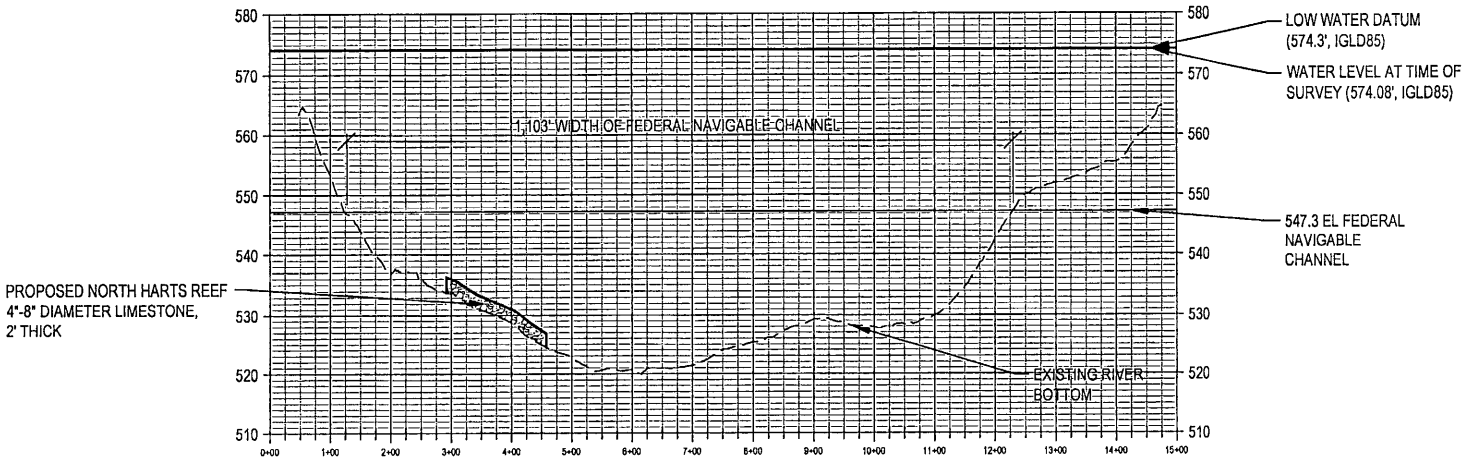
PROJECT NORTH

0 200' 400'
SCALE: 1"=400'

SCALE

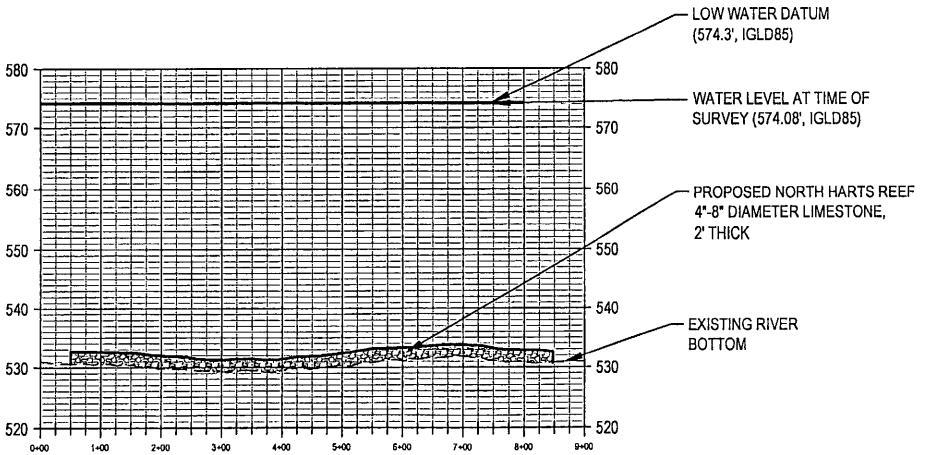
50350.001
PROJECT NUMBER

FIGURE 3
DRAWING NUMBER



1 NORTH REEF LATITUDINAL CROSS SECTION
PROFILE

SCALE: 1"=200' HORIZ./1"=20' VERT.



2 NORTH REEF LONGITUDINAL CROSS SECTION

SCALE: 1"=200' HORIZ./1"=20' VERT.

FILE NUMBER:LRE-2013-00867-12 (13-74-149)
Hart's Light Reef Project
BY: Regents of the University of Michigan
St. Clair River
East China, St. Clair County, Michigan
SHEET 5 OF 6

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

SMITHGROUPJJR

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	DATE
PERMITTING	11/12/2013
PERMITTING-USACE	01/21/2014

DRAWING TITLE
HARTS LIGHT NORTH
REEF PROFILES

PROJECT NORTH

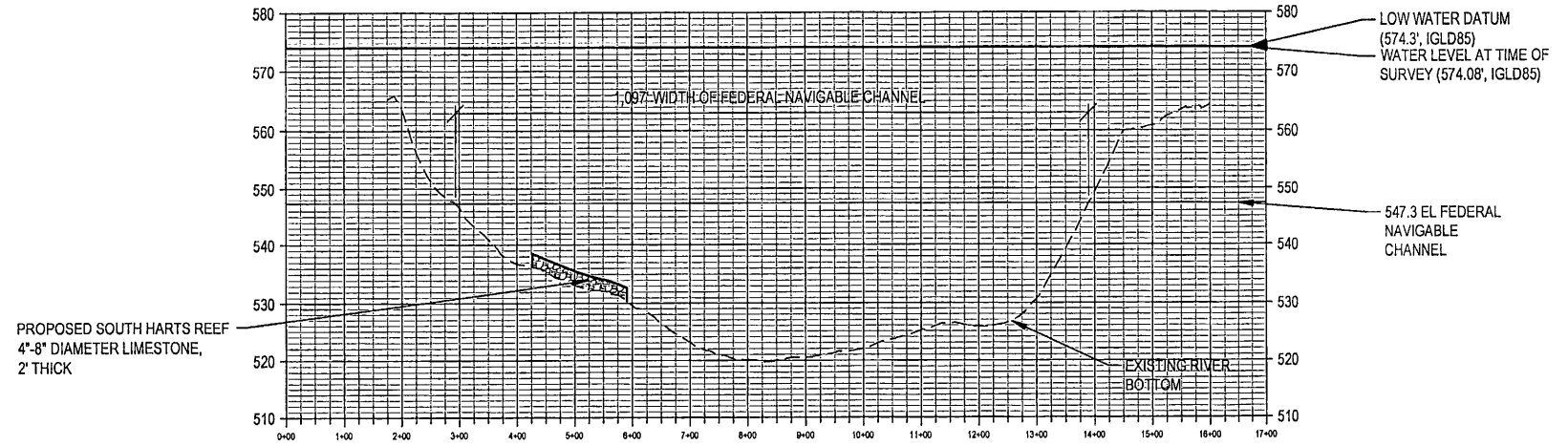
0 100'/10' 200'/20'

SCALE: 1"=200' HORIZ./1"=20' VERT.
SCALE

50350.001
PROJECT NUMBER

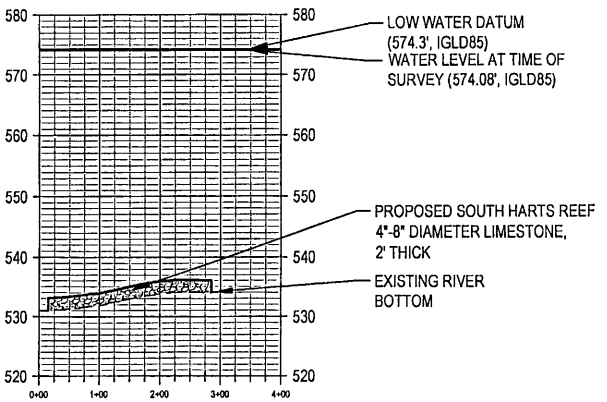
FIGURE 4
DRAWING NUMBER

FILE:P:\50350.001\CAD\CAS\ Clare Reef\50632-HARTS REEFS-USACE.dwg USER:rechtinow DATE: Jan. 21, 2014 TIME: 11:01 am



1 SOUTH REEF LATITUDINAL CROSS SECTION
PROFILE

SCALE: 1"=200' HORIZ./1"=20' VERT.



2 SOUTH REEF LONGITUDINAL CROSS SECTION
PROFILE

SCALE: 1"=200' HORIZ./1"=20' VERT.

FILE NUMBER:LRE-2013-00867-12 (13-74-149)
Hart's Light Reef Project
BY: Regents of the University of Michigan
St. Clair River
East China, St. Clair County, Michigan
SHEET 6 OF 6

ST. CLAIR REEF PROJECT
EAST CHINA,
ST. CLAIR COUNTY, MICHIGAN

Owner:
UNIVERSITY OF MICHIGAN
MICHIGAN SEA GRANT

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ISSUED FOR	DATE
PERMITTING	11/12/2013
PERMITTING-USACE	01/21/2014

DRAWING TITLE
HARTS LIGHT SOUTH REEF PROFILES

PROJECT NORTH

0 100'/10' 200'/20'

SCALE: 1"=200' HORIZ./1"=20' VERT.
SCALE

50350.001
PROJECT NUMBER

FIGURE 5
DRAWING NUMBER

FILE:P:\50350.001\CAD\CAS\St Clare Reef\50632-HARTS REEFS-USACE.dwg USER:rechtinow DATE:Jan. 21 2014 TIME: 11:01 am

APPENDIX E. DOCUMENTATION RELEVANT TO PUBLIC INVOLVEMENT

- Letter of Support, City of Detroit
- Letter of Support, City of Algonac
- Letter of Support, East China Township
- Project Fact Sheet, highlighting the St. Clair River projects
- Letter distributed to shoreline residents in East China
- Letter signed by all shoreline homeowners adjacent to Harts Light Reef

CITY OF DETROIT
RECREATION DEPARTMENT
ADMINISTRATION OFFICE

18100 MEYERS
DETROIT, MICHIGAN 48235
PHONE 313•224•1100
FAX 313•224•3544
WWW.DETROITMI.GOV

April 30, 2013

Mr. Andy Hartz
Southeast District Resources Unit Supervisor
MDEQ Water Resources Division
27700 Donald Court
Warren MI 48092-2793

RE- Authorization to Construct on City of Detroit, Ft Wayne Park property for Habitat Enhancements

Dear Mr. Hartz:

The Detroit Recreation Department supports the University of Michigan Board of Regents project to construct habitat enhancements within the Detroit River at a location approximately 150-200 feet offshore of the Historic Fort Wayne city park in Detroit. All appropriate MDEQ/USACE pemits will be obtained before any construction pusuant to the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended for work within the Detroit River..

The Detroit Recreation Department authorizes the University Of Michigan Board Of Regents and it's agent, SmithGroup JJR, LLC to act in its behalf for construction offshore of the City of Detroit, Ft. Wayne Park property. We understand that you will not need access to the property at Fort Wayne in any way to complete this project.

Should you have any questions regarding the permitting, please contact Mr. Douglas Denison, SmithGroupJJR Project Manager at (734)-669-2662. If you have any questions regarding this authorization feel free to contact the office at (313)-224-1123.

Sincerely,

Alicia C. Minter
Director

cc. D.Denison - (SmithGroupJJR LLC)
S. Brinkmann – (DRD)
T. Karl (GSD)

City of Algonac

805 St. Clair River Drive • P.O. Box 454 • Algonac, Michigan 48001
(810) 794-9361 • Fax: (810) 794-4804

July 3, 2013

Mr. Andy Hartz
Southeast District Resources Unit Supervisor
MDEQ Water Resources Division
27700 Donald Court
Warren, MI 48091 - 2793

Dear Mr. Hartz:

The City of Algonac owns property along the St. Clair River within City Limits and just onshore of the proposed Pointe aux Chenes spawning reef restoration project. The City Council, by authority of the attached resolution, gives permission to the University of Michigan and their team to add rock to the bottom of the St. Clair River offshore from the park property in order to create a fish habitat reef.

We have been notified about this project and I understand that:

- The reef could be located approximately 300 feet offshore from the park property.
- The reef will be made of quarried limestone, a non-polluting material.
- Rock will be placed on the bottom of the river, forming a bed of loose rock about 2 feet deep, under 35 feet of water, and will not interfere with navigation.
- The project will be entirely within the St. Clair River and no activity will occur on the park property.
- All appropriate MDEQ and USACE permits will be obtained before any construction begins.
- The reef will support the reproduction of lake sturgeon, walleye and lake whitefish and could improve fishing opportunities.

Sincerely,

Doug Alexander
City Manager

CITY COUNCIL MEETING
Council Chambers, 805 St. Clair River Drive
Algonac, MI 48001
DRAFT

A regular meeting of the Algonac City Council was called to order at 7:00 p.m. on Tuesday, July 2nd, 2013 by Mayor Irene Bird. The meeting was held in Council Chambers, 805 St. Clair River Drive, Algonac, MI 48001.

ROLL CALL:

Present: Amy Amiels
Irene Bird, Mayor
Ray Martin
Helen Meldrum
Joe Nugent
Mark Thompson
Gary Tuzinowski, Mayor Pro-Tem

Absent:

Others: City Manager Doug Alexander
City Clerk Greenia, Jeri Packer,
Mr. and Mrs. Robert Scruggs,
Diane Strevel, Ada Smith,
John Monte, Cathy Wenz,
Ms.Tietzel

MOMENT OF SILENT PRAYER

Mayor Bird called for a moment of silent prayer.

PLEDGE OF ALLEGIANCE

Mayor Bird led the Pledge of Allegiance.

AMENDMENT OF AGENDA
CO 07-01-13 Amend Agenda

Motion by Meldrum, supported by Amiels to amend the agenda by adding item 8g under new business – HVAC System. Motion unanimously carried.

PUBLIC COMMENT

Robert Scruggs, 735 Townsend, was present to speak to City Council regarding his request for a Special Assessment District to have the canal by his property dredged and the cost put on the property taxes.

CITY MANAGER'S REPORT

CO 07-02-13 Approve City Manager's Report

Motion by Thompson supported by Amiels to hear and approve the City Manager's report of June 28th, 2013 as presented. Motion unanimously carried.

CONSENT AGENDA

The following items were on the Consent Agenda for the July 2nd, 2013 Algonac City Council Meeting:

1) Consent Agenda
    a) City Council Minutes
        1) Regular Meeting June 18th, 2013
    b) Communications and Notices
        1) Comcast Letter
        2) Legal Opinion Regarding Special Assessment Request
        3) Thank You Note - Patti Ries, Memorial Bench

CO 07-03-13 Approve Consent Agenda

Motion by Thompson, supported by Amiels to approve the Consent Agenda for the July 2nd, 2013 meeting of the Algonac City Council as presented. Motion unanimously carried.

UNFINISHED BUSINESS

None at this time.

NEW BUSINESS:

Housing Commission Appointment

CO 07-04-13 Housing Commission Appointment

Motion by Meldrum, supported by Nugent to appoint Doug Alexander to the Algonac Housing Commission to fill the unexpired term ending on June 11th, 2016. Motion unanimously carried.

DPW Temporary Laborer Wage Scale

CO 07-05-13 Approve DPW Temporary Laborer Wage Scale

Motion by Thompson supported by Nugent to support the recommendation of the City Manager to amend Section 7 of the 2013-14 City of Algonac General Appropriations Act by adding the classification of "DPW Temporary Laborer" at the hourly rate of $14.00 per hour. Motion unanimously carried.

Engineering Services, Phase 2, Seawall
CO 07-06-13 Approve Engineering Services, Phase 2, Seawall Restoration Project

Motion by Nugent supported by Amiels to support the approval of the proposal of Testing Engineers & Consultants to provide additional soils testing services in the amount of $7,030 for the Riverfront Park Seawall Repair Project as outlined in the attached submittal from the firm more fully describing said additional services to be provided. Motion unanimously carried.

Actuarial Valuation – Retiree Health Care
CO 07-07-13 Receive and File OPEB Report

Motion by Meldrum supported by Amiels City Manager Alexander received the attached OPEB Report to receive and file the Actuarial Valuation Report as prepared by Gabriel Roder Smith and Company for the City of Algonac's OPEB Liabilities through December 31, 2011. Motion unanimously carried.

Health Care Administration Agreement
CO 07-08-13 – Approve Business Associate Agreement – Marwil & Associates – Administering Health Insurance Program

Motion by Thompson supported by Nugent to adopt the recommendation of the City Manager to enter into the attached "Business Associate" Agreement with Marwil and Associates as required by Federal HIPPA regulations and authorize him on behalf of the City of Algonac to execute the same. Motion withdrawn, support withdrawn.

CO 07-09-13 Table Consideration of Health Care Administration Agreement with Marwil and Associates

Motion by Meldrum, supported by Thompson to table consideration of the Health Care Administration Agreement with Marwil & Associates until the next meeting of July 16th, 2013 and request that a representative of Marwil and Associates be present. Motion unanimously carried.

Approval of US Geological Service Reef Fish Spawning Project

CO 07-10-13 Approval of United States Geological Service Reef Fish Spawning Project

Motion by Thompson supported by Amiels to support the recommendation of the City Manager granting the United States Geological Service permission to construct the fish spawning reef, opposite Riverfront Park in the City of Algonac as more fully described in their attached communication of June 21st and further granting the City Manager authorization to execute the attached letter acknowledging the granting of such permission to the USG's. Motion unanimously carried.

Approve HVAC Bid – City Council Chambers

CO 07-11-13 Award Bid to Boulier for New HVAC Unit – Council Chambers

Motion by Nugent, supported by Amiels to approve the bid of $5,485 from Boulier Heating and Cooling to replace the HVAC unit for City Council Chambers, and further that City Council waive any and all mechanical permit fees that may normally apply. Motion unanimously carried.

ACCOUNTS PAYABLE

CO 07-12-13 Approve Accounts Payable

Motion by Amiels supported by Thompson to approve and pay accounts payable and payroll in the amount of $78,912.06 as presented. Motion unanimously carried.

ITEMS FOR NEXT AGENDA

Marwill and Associates – Business Associate Agreement

COUNCIL COMMENTS

Council Member Thompson wished everyone a Happy 4th of July and reminded them that the Pickerel Tournament was this weekend.

Council Member Martin noted he had walked by the memorial bench and it looked very nice. The staff should be commended for a good job on this. City Manager Alexander said information on this would be in the newsletter.

Council Member Amiels wished everyone a Happy 4th of July, wished them all to be safe, and congratulated her sons for winning First Place in their Little League Baseball division.

Mayor Irene Bird thanked Mr. and Mrs. Scruggs for their input on the dredging project.

Council Member Nugent wished everyone a Happy 4th of July.

Council Member Meldrum wished everyone a Happy 4th of July, and added not to drink and drive.

Mayor Pro-Tem Tuzinowski wished all a Happy 4th of July.

ADJOURNMENT
CO 07-13-13 Adjournment

Motion by Thompson supported by Amiels to adjourn the meeting at 7:55 p.m. Motion unanimously carried.

Signed

Irene Bird, Mayor

Respectfully Submitted:

Cindi Greenia, Clerk

CERTIFICATION

I certify that the foregoing is a true and complete copy of minutes of the Algonac City Council meeting, County of St. Clair and State of Michigan held on Tuesday, July 2nd, 2013, and public notice of said meeting was given pursuant to and in accordance with the requirements of Act No. 267 of the Public Acts of 1976, as amended, being the Open Meetings Act, and the Minutes of said meeting have been or will be made available as required by said Act.

Cynthia L. Greenia, City Clerk
City of Algonac

Charter Township of East China
OFFICES AT 5111 RIVER ROAD ♦ EAST CHINA, MI 48054 ♦ 810-765-8879 ♦ FAX 810-765-1408

Mr. Andy Hartz
Southeast District Resources Unit Supervisor
MDEQ Water Resources Division
27700 Donald Court
Warren, MI 48092 - 2793

September 25, 2013

Dear Mr. Hartz:

A team led by the University of Michigan and the US Geological Survey is interested in adding rock to the bottom of the St. Clair River to create a fish spawning reef. Several reef structures could be located offshore from East China, Michigan, adjacent to private residences on River Road and Clarke Drive.

The East China Township has been notified about this project and recognizes that:

- If enough shoreline property owners give their permission, the reef could be located 300 feet offshore homes along River Road and Clarke Drive.
- The reef will be made of 4 -8 inch limestone rocks, a non-polluting material.
- Rock will be placed on the bottom of the river, forming a bed of loose rock about 2 feet thick, under at least 35 feet of water, and will not interfere with navigation.
- The project will be entirely within the St. Clair River and no activity will occur on the upland property of adjacent homes.
- All appropriate MDEQ and USACE permits will be obtained before any construction begins.
- The reef will support the reproduction of lake sturgeon, walleye and lake whitefish and could improve fishing opportunities.

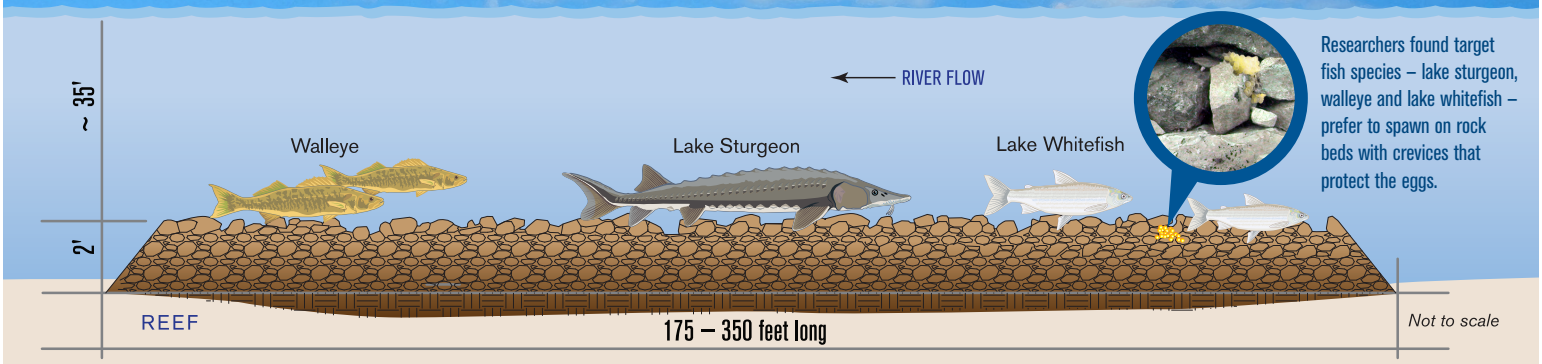
The East China Township is supportive of this project and the goals of restoring fish habitat in the St. Clair River.

Sincerely,

Larry Simons

Larry Simons
Supervisor

RESTORING FISH HABITAT IN THE ST. CLAIR AND DETROIT RIVERS



After successfully establishing several artificial spawning reefs in the Detroit and St. Clair rivers, a research team is creating three more habitat restoration sites in 2013 to benefit native fish.

AN ABUNDANCE OF FISH

Historically, the St. Clair and Detroit rivers supported a diverse and productive fishery. Lake sturgeon, walleye and lake whitefish traveled to these rivers to spawn, depositing and fertilizing their eggs in rocky areas with fast-flowing currents.

Construction of the Livingstone Channel in the Detroit River.

Beginning in 1874, however, both the St. Clair and Detroit River were extensively modified. The river bottoms were dredged to create deep channels for large, commercial ships. The dredging and disposal of dredged materials such as dirt, sediment and rocks, changed the flow of the river and damaged the natural limestone reefs where millions of fish spawned (reproduced). These and other impacts — including overfishing and shoreline development — have dramatically reduced the populations of native fish, particularly lake sturgeon.

Despite the decline, the St. Clair and Detroit rivers continue to support one of the largest populations of lake sturgeon remaining in the Great Lakes, in part because most other large rivers are dammed. If the population is able to grow, it could help re-populate other parts of the Great Lakes.

LOST SPAWNING HABITAT

Scientists have conducted a detailed analysis of the damage done to historical spawning areas and searched for the few places where native fish still reproduce. A focus has been on sturgeon since they are listed as threatened or endangered by most of the Great Lakes states and as a species of concern in Ontario.

The team found that more than 60 miles of the Detroit River have been dredged, which destroyed natural limestone reefs in the Livingstone Channel.

Today, the remaining lake sturgeon spawn in only a couple locations in the St. Clair and Detroit rivers. Because very few natural rocky areas remain, sturgeon have been found dropping their eggs on some unusual materials, such as the coal cinders that were dumped in the river when ships unloaded near Algonac, Michigan.

Many natural resource professionals believe that the recovery of native fish is limited by a lack of adequate spawning habitat, but that creating reefs that mimic the lost natural limestone reefs may help rebuild populations.

LEARNING TO RESTORE

Between 2004 and 2012, a team of scientists built three reefs in the St. Clair and Detroit rivers. The team took an adaptive management approach, questioning and evaluating as they went along.

What type of rock should be used?

Each reef was constructed using different types of rock material. Based on these three projects, the team discovered that the target fish species — lake sturgeon, walleye and lake whitefish — weren't all

FASCINATING FISH

In order to help lake sturgeon recover, scientists have been studying their life cycle, movement and habitat requirements. Lake sturgeon are unlike any other fish in the Great Lakes — they can grow up to 6 feet in length and can weigh up to 300 pounds. They are slow to mature: females take 20-25 years to reach reproductive age, while males take 15 years.

Females spawn only once every four years on average, and males typically spawn every other year. Female sturgeon live 80-150 years, while males live an average of 55 years.

Although lake sturgeon look somewhat like sharks, they don't have teeth, and instead, suck up invertebrates from the bottom of the river or lake.

Lake sturgeon are considered threatened or endangered in seven of the eight Great Lakes states and estimates indicate that their population is now 1 percent of what it once was.

Despite strict restrictions on fishing and improvements in water quality, lake sturgeon's recovery has been very slow. Because sturgeon take decades to reach reproductive age, restoration efforts often take as many or more years to see results in the form of growing populations.

that picky, as long as rocks were piled deep enough to form crevices that protect the eggs and that the rocks remain relatively free of silt, algae and mussels.

It was also discovered that some undesirable, invasive species do have a preference for rock type:

- Sea lamprey will build nests in gravel that is less than 1-2 inches in diameter; and
- Round goby are particularly fond of piles of large rocks.

The conclusion: 4-8 inch limestone works best to encourage native species development, while discouraging invasive species.

Where should the reefs be built?

Areas with strong currents and deep waters are ideal places to create spawning habitat for the target native species. Scientists at the U.S. Geological Survey developed a computer model using water depth and flows in the St. Clair and Detroit rivers to predict where lake sturgeon would spawn if the river bottom were suitable.

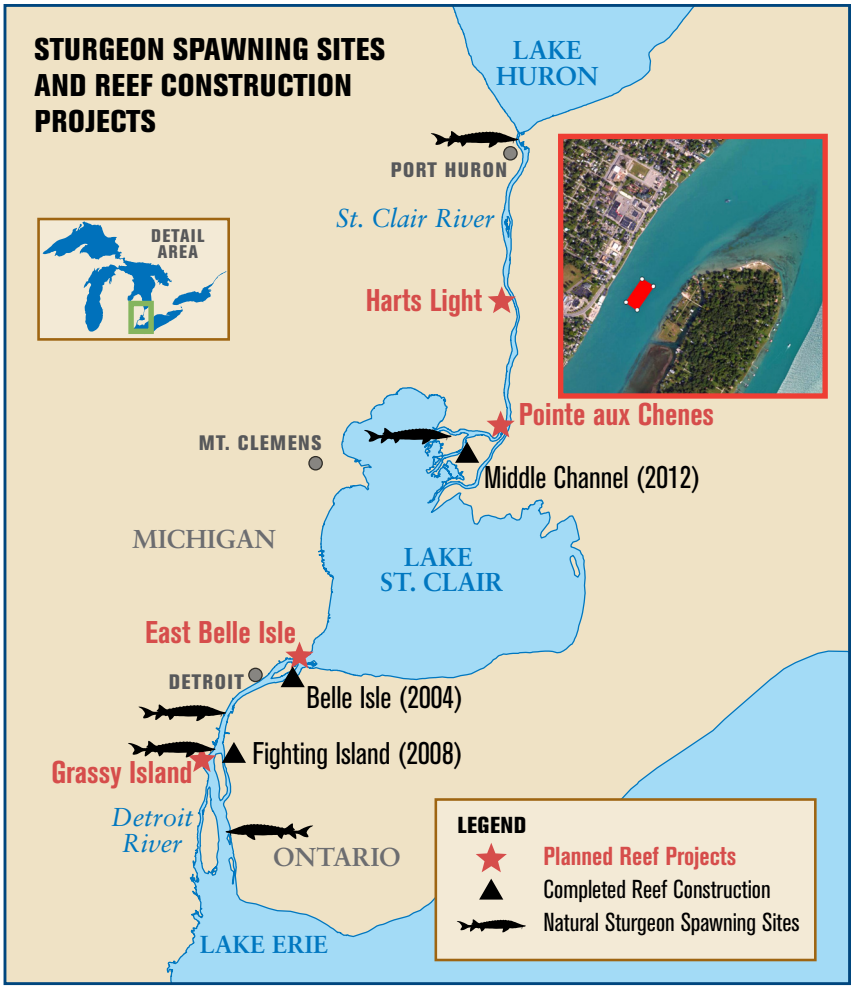
Project partners used the model to identify high-priority places for constructing reefs and then selected specific locations without contaminated sediments or heavy boat traffic.

At a potential reef site, underwater cameras and sonar are used to make sure the river bottom is hard and smooth and lacks any fish habitat. When possible, reefs are placed close to known spawning areas and upstream of wetlands that could protect young fish after they hatch.

What comes next?

In 2014, project partners plan to build several spawning reefs in the St. Clair and Detroit rivers based on the lessons learned from earlier habitat restoration.

The design and restoration process for each reef will be very similar, resulting in a single bed of loose, interlocking rock about 2 feet thick.



New spawning reefs will be established in three different areas of the St. Clair and Detroit rivers. Tentatively, they will include:

- A 1-acre reef, at either Grassy Island or East Belle Isle in the Detroit River.
- A 2-acre reef, 300 feet offshore from the City of Algonac in the St. Clair River (Pointe aux Chenes).
- 2 or 3 reefs, 300 feet offshore from East China Township in the St. Clair River, totaling 4 acres (Harts Light).

How do we know the reefs are effective?

A diverse team of scientist will study the river before and after the reefs are established. They will use a variety of techniques to determine if fish are depositing eggs on the reef and if the eggs produce healthy young fish. Other scientists will monitor populations of adult and juvenile fish on and near the reefs.

GREAT LAKES RESTORATION

These reef projects are supported by grants from the Great Lakes Restoration Initiative, the Sustain Our Great Lakes Program and the U.S. Fish and Wildlife Service. This work is a result of a long-term collaboration among federal, state and private groups interested in studying and restoring the St. Clair-Detroit River System. Project partners include Michigan Sea Grant, the University of Michigan Water Center, the U.S. Geological Survey, U.S. Fish and Wildlife Service, SmithGroup JJR, Michigan Department of Natural Resources, St. Clair-Detroit River Sturgeon for Tomorrow and the Michigan Wildlife Conservancy.

HURON-ERIE CORRIDOR INITIATIVE | Great Lakes RESTORATION | SUSTAIN OUR GREAT LAKES | Sea Grant Michigan

www.huron-erie.org | www.miseagrant.umich.edu/restoration

CONTACT

Lynn Vaccaro
Michigan Sea Grant
Lvaccaro@umich.edu

Jennifer Read
University of Michigan
Water Center
jenread@umich.edu

Bruce Manny
U.S. Geological Survey
bmanny@usgs.gov

MICHU-13-709

MICHIGAN SEA GRANT COLLEGE PROGRAM
UNIVERSITY OF MICHIGAN ■ MICHIGAN STATE UNIVERSITY

Sea Grant Michigan

Dedicated to the sustainable use of Great Lakes resources.

www.miseagrant.umich.edu

October 15, 2013

Dear Yolanda Johnson,

We are seeking your support for an important fish habitat restoration project in the St. Clair River. As you may know, fish populations in the area are suffering because there is a lack of suitable habitat for spawning. We are part of a research team made up of local, state, national and private partners working to bolster the local fish populations. We are doing that by constructing spawning reefs — or areas for fish to deposit their eggs — and we need your assistance.

The area approximately 250 feet from the shore of your property has been identified as an ideal place for us to build a reef. However, we want to make sure we have your support before finalizing plans and applying for permits.

What to Expect

- The proposed reef would be a bed of 4-8 inch limestone rocks, about 2 feet thick, covering 1-2 acres of river bottom, 40 feet underwater.
- When we have permission and permits, a marine construction company will place rock on the river bottom.
- A construction barge could be in the river near your property for an estimated 2-4 weeks. There will be no activity onshore on your property — the construction is strictly performed in the river during normal working hours, Monday through Friday.

The reef will support fish species like sturgeon, walleye and whitefish that, in order to reproduce successfully, require rocky areas in swiftly flowing water. The project will not only enhance the river's habitat and help fish populations, but should also improve fishing in the river.

Past Success

Over the last 10 years, project partners have built and studied several spawning reef projects in the St. Clair and Detroit rivers that have successfully attracted a range of fish. The most recent project was in the Middle Channel of the St. Clair River, near Algonac. Lake sturgeon were observed spawning on the reef almost immediately — a great success! To read more about the project and see video of lake sturgeon on the new reef, see: www.miseagrant.umich.edu/restoration.

Your Permission

We are asking for your permission to build a spawning reef 300 feet from the shore of your property. If you support this project, please sign and return the enclosed letter of permission or draft your own letter stating support. Please consider attending the meeting on June 26 as mentioned above or contact one of us with questions. We appreciate your consideration and support.

Sincerely,

Lynn Vaccaro
Project Coordinator
Michigan Sea Grant
520 E. Liberty, Suite 310, Ann Arbor, MI 48104
LVaccaro@umich.edu; (734) 763-1530

Jennifer Read
Project Manger
University of Michigan Water Center
214 S. State St., Suite 200, Ann Arbor, MI 48104
jenread@umich.edu; (734) 763-2642

Mr. Andy Hartz
Southeast District Resources Unit Supervisor
MDEQ Water Resources Division
27700 Donald Court
Warren, MI 48092 - 2793

Dear Mr. Hartz:

I own property along the St. Clair River in East China Township. I give permission to the University of Michigan and their team to add rock to the bottom of the St. Clair River offshore from my property in order to create a fish habitat reef.

I have been notified about this fish habitat project and I understand that:

- If enough shoreline property owners give their permission, the reef could be located 250 feet offshore from my upland property.
- The reef will be made of 4 -8 inch limestone rocks, a non-polluting material.
- Rock will be placed on the bottom of the river, forming a bed of loose rock about 2 feet thick, under 35 feet of water, and will not interfere with navigation.
- The project will be entirely within the St. Clair River and no activity will occur on my upland property.
- All appropriate MDEQ and USACE permits will be obtained before any construction begins.
- The reef will support the reproduction of lake sturgeon, walleye and lake whitefish and could improve fishing opportunities.

Sincerely,

Signature: Yolanda S Johnson Date: 10.18.13

Name: YOLANDA S JOHNSON

Address: 4189 River Road, East China, MI 48054

Parcel Number (if known): 74-18-756-0023-000

Contact Information: 586 945-0469 Cell

APPENDIX F. Documentation Relevant to Endangered and Threatened Species

- Correspondence with US Fish and Wildlife Service regarding federally listed species.
- Letter stating no effect likely for federally listed species, generated through e-consultation
- USFWS Fact Sheet - Rayed Bean *(Villosa fabalis)*
- USFWS Fact Sheet - Northern Riffleshell *(Epioblasma torulosa rangiana)*
- Correspondence with MDNR Wildlife Division about the need for a Rare Species Review.
- Letter from MNFI regarding Rare Species Review #1425 (Harts Light Reef, St. Clair River)
- Letter from MNFI regarding Rare Species Review #1426 (Point Aux Chene Reef, St. Clair River)
- Letter from MNFI regarding Rare Species Review #1427 (East Belle Isle Reef, Detroit River)
- Letter from MNFI regarding Rare Species Review #1428 (Fort Wayne Reef, Detroit River)
- Letter from MNFI regarding Rare Species Review #1429 (Northeast Grassy Island Reef, Detroit River)

UNIVERSITY OF MICHIGAN

Lynn Vaccaro <lvaccaro@umich.edu>

Re: section 7 consultation process

10 messages

Lynn Vaccaro <lvaccaro@umich.edu> Wed, May 21, 2014 at 12:42 PM
To: "Dandridge, Tameka" <tameka_dandridge@fws.gov>
Cc: Paul Evanoff <paul.evanoff@smithgroupjjr.com>

Dear Tameka,

Thank you for talking with me about how we should evaluate potential impacts for federally listed species. I wanted to summarize what our approach and make sure we have correctly followed your advice.

Brief Background
I'm working with a mulit-agency team of scientists that is restoring fish spawning habitat by creating spawning reefs in the St. Clair and Detroit Rivers. The reefs are essentially beds of loose quarried rock, 2 feet thick, that are placed via crane and barge on the river bottomlands at least 200 feet from shore, in water at least 25 feet deep.

The team has completed three pilot spawning reef projects over the past 10 years and now has funds for several upcoming projects from the USEPA (Great Lakes Restoration Initiative) through the USGS Great Lakes Science Center. To help USGS ensure NEPA compliance we have prepared an Environmental Assessment (draft report attached, appendices are at this link). The EA discusses potential reef projects in five locations, two in the St. Clair River which are fairly well planned, and three in the Detroit River which are in preliminary assessment and planning stage.

What we're looking for:
The EPA Region 5 NEPA office has requested that we initiate communication with FWS to determine if additional consultation is needed to determine if any federally listed endangered or threatened species are present within the project boundaries, and if project implementation would or could detrimentally affect any listed species or their critical habitat.

What we've done:
Our team conducts extensive physical and biological assessment at each proposed reef location in advance of project permitting and spawning reef construction. Pre and post assessment includes an evaluation of fish egg deposition (with egg mats), adult fish use of the area (via gill nets, set lines and minnow traps), and larval fish production and drift (with bongo samplers and D frame drift nets), as well as underwater video, sonar and scuba dive surveys to characterize the river bottom and properly design the reef.

This assessment process has given us a good understanding of the existing habitat and aquatic species present at a proposed location. We only locate projects in areas with relatively smooth hard-pan clay sediments. If we find any structures (e.g., tree trunks, old docks, rock outcrops) that seem to be used by fish, we avoid placing rock in that area. Although there may be encrusted Dreissenid mussels at a reef site, there are generally few other resident aquatic species. Completed projects demonstrate that the constructed spawning reefs are used by a number of fish species with similar spawning habitat requirements, including lake sturgeon, lake whitefish, walleye, suckers and catfish.

Based on your advice, we completed an e-consultation Section 7 process and reviewed the FWS database at the link you provided. We feel confident that no federally listed species will be negatively impacted by the proposed spawning reefs. We have not observed any native mussels or mussel shells in the areas proposed for spawning habitat restoration. Any potential impact for fish is likely to be positive or neutral. And because the reefs are located in waters at least 25 feet deep and all construction happens via barges, there are no expected impacts

for birds or aquatic plants. The draft EA report discusses lake sturgeon, northern madtom and the northern riffleshell and their habitat requirements and concludes that lake sturgeon and northern madtom are likley to benefit and the northern riffleshell is likely to experience no effect from the proposed restoration. We're adding a statement about the Rayed Bean mussel, which is unlikely to be in the connecting channels or the clay bottom sites we select for restoration work, and therefore will not be affected.

Tameka, do you have any concerns with our approach? Thanks for your help and guidance.

Sincerely,
Lynn Vaccaro
Project coordinator of the "reef restoration team"

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty St., Suite 310
(734) 763-1530

On Thu, May 1, 2014 at 10:04 AM, Dandridge, Tameka <tameka_dandridge@fws.gov> wrote:

> http://www.fws.gov/midwest/endangered/section7/s7process/index.html
>
> --
> Tameka N. Dandridge
> U.S. Fish and Wildlife Service
> East Lansing Field Office
> 2651 Coolidge Road
> Suite 101
> East Lansing, Michigan 48823
> tameka_dandridge@fws.gov
> ***My schedule: M: 7-4:30; T: 7-12; W: 7-3:30; Th: 7-11; F (telework): 7-11***

Dandridge, Tameka <tameka_dandridge@fws.gov> Wed, May 21, 2014 at 2:32 PM
To: Lynn Vaccaro <lvaccaro@umich.edu>

Hi Lynn,

Sounds like to followed appropriate "protocol" for the federally listed species portion of this project. Because you have determined that the project will have no effect northern riffleshell and rayed bean mussels, section 7 consultation is complete and we do not provide concurrence for such determinations. We do recommend you document your analyses for your records.

You should also contact the Michigan Natural Features Inventory for any state listed species that could be impacted by this project. Becca Rogers (rlr@msu.edu) is their GIS specialist and for a fee, MNFI will provide you with information on state listed species.

~Tameka
[Quoted text hidden]

May 22, 2014

Dear Tameka Dandridge:

As you requested, we have completed the USFWS E-consultation to meet the Section 7 requirements under the Endangered Species Act of 1973 for the proposed "Remediating Native Fish Spawning Habitat in the St. Clair-Detroit River System" projects. Based on this process, we conclude that the projects are *not likely to adversely affect* northern riffleshell mussels and rayed bean mussels or its habitat.

The proposed projects are located in Wayne and St. Clair Counties, Michigan, at 5 different locations. The work will be implemented under the supervision of the United States Geological Survey (USGS) Great Lakes Science Center in cooperation with the University of Michigan Sea Grant program. The team has completed three pilot spawning reef projects over the past 10 years and now has funds for several upcoming projects from the USEPA (Great Lakes Restoration Initiative) through the USGS Great Lakes Science Center. The reef projects occur in five locations, two in the St. Clair River which are fairly well planned, and three in the Detroit River which are in preliminary assessment and planning stage.

Regional Map of the St. Clair – Detroit River System

The proposed project involves restoring fish spawning habitat by creating spawning reefs in the St. Clair and Detroit Rivers. The reefs are essentially beds of loose quarried limestone rock, 2 feet thick and are placed via crane and barge on the river bottomlands at least 200 feet from shore, in water at least 25 feet deep.

We carefully reviewed (May 20, 2014) your agency's Section 7 Consultation website for a list of species and critical habitat that "may be present" within the project area. There are 2 species that may be present on the river bottom of the proposed project sites: northern riffleshell mussel (*Epioblasma torulosa rangiana*) in the Detroit River system, and rayed bean mussel (*Villosa fabalis*) in the St. Clair and Detroit River system.

Northern riffleshell mussel is an endangered species that occupies less that 5 percent of its former range. It can be found in large river systems with adults embedded in a substrate consisting of dense sand and gravel.

Rayed bean mussel is a recently listed (2012) endangered species that mostly live in small headwater creeks and glacial lakes spending most of its life embedded in the substrate. It prefers gravel and sand substrates and can be found in and around roots of aquatic vegetation.

The reef project team specifically selected sites where the river bottom consisted of hard-pan clay with little or no loose sediments. Hard-pan clay can physically support the engineered spawning reefs while typically supporting little aquatic life. This type of bottomland is smooth, solid and free of on-going sediment deposition, minimizing the risk of sediment accumulating in the reef.

The site assessment process completed to date, has given us a good understanding of the existing habitat and aquatic species present at a proposed location. Surveys of the surficial sediments were conducted using side-scan sonar to determine the composition and extent of the bottom substrates. Multiple sonar transects were conducted at each site to provide shore-to-shore coverage over a 2 to 2.5 mile stretch of the river in order to select target reef locations. Follow up underwater video surveys of the sites were conducted using a remote "drop-camera" which provided real-time images of the bottom substrates to the operators on the river surface. Global Positioning System (GPS) positional data were overlain on the video image in order to spatially locate the specific video images with the corresponding sonar imagery. Sonar and video data allowed the team to ground-truth model output, determine substrate composition and distribution, and select specific coordinates for spawning reefs.

Resulting analysis of the sonar imagery indicated a considerable amount of small (2 to 3 m^2) to larger (10+ m^2) objects scattered throughout the St. Clair River sites. Analysis of the underwater video at these locations indicated that a majority were debris fields, primarily old wooden structures, tree trunks/logs, etc., that were acting as refuge for many different fish species. Each debris field was mapped on the sonar imagery and catalogued, with a corresponding GPS location. It was decided that reefs would be sited to avoid the debris, since they appear to provide habitat for existing fish populations.

We have not observed any native mussels or mussel shells in the areas proposed for spawning habitat restoration. Any potential impact for fish is likely to be positive or

neutral. And because the reefs are located in waters at least 25 feet deep and all construction happens via barges, there are no expected impacts for birds, bats or plants.

The EA report discusses lake sturgeon, northern madtom, rayed bean and northern riffleshell and their habitat requirements and concludes that lake sturgeon and northern madtom are likely to benefit and the rayed bean and northern riffleshell are likely to experience no effect from the proposed restoration.

For these reasons, we conclude that the “Remediating Native Fish Spawning Habitat in the St. Clair-Detroit River System” projects is *not likely to adversely affect* northern riffleshell mussels and rayed bean mussels or its habitat.

Sincerely,
Paul Evanoff
Consultant to the Reef Restoration Team

Lynn Vaccaro
Project Coordinator for the Reef Restoration Team

Rayed Bean (freshwater mussel)
Villosa fabalis

The rayed bean is a freshwater mussel that the U.S. Fish and Wildlife Service listed as an *endangered species*. Endangered species are animals and plants that are in danger of becoming extinct. *Threatened species* are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

Photo by USFWS; Angela Boyer

The rayed bean, a small freshwater mussel of the upper Midwest and Eastern United States, is endangered due to population declines and continuing threats to the rivers where it can still be found..

What is the Rayed Bean?

Appearance: The rayed bean is a small freshwater mussel, usually less than 1.5 inches long. Its shell is smooth-textured and green, yellowish-green, or brown with numerous dark-green wavy lines. The male's shell shape is generally elongated, whereas the female's is smaller and elliptical.

Range: The rayed bean historically was found across a wide expanse that included parts of the Midwest and eastern United States, north to Ontario, Canada. Once found in at least 115 streams, canals, and lakes, the rayed bean now occurs in only 31 streams and 1 lake; a 73 percent reduction in the number of occupied streams and lakes. The species has been extirpated from Illinois, Kentucky, and Virginia but is still found in Indiana, Michigan, New York, Ohio, Pennsylvania, and Ontario, Canada. After extirpation from Tennessee and West Virginia, reintroductions have restored the rayed bean to these states.

Habitat: The rayed bean generally lives in smaller, headwater creeks, but it is sometimes found in large rivers and wave-washed areas of glacial lakes. It prefers gravel or sand substrates, and is often found in and around roots of aquatic vegetation. Adults spend their entire lives partially or completely buried in substrate, filtering water through their gills to remove algae, bacteria, detritus, microscopic animals, and dissolved organic material for food.

Reproduction: The life cycle of the rayed bean, like most freshwater mussels, is unusual and complex. Males release sperm into the water column that is then siphoned by females to fertilize their eggs. Fertilized eggs develop into microscopic larvae, called glochidia, within special gill chambers. Females expel mature glochidia, which then must attach to the gills or fins of specific host fish species to complete development into juvenile mussels. After attaching to host fish, glochidia mature within a few weeks. Juvenile mussels then drop off and continue to grow, if they fall onto appropriate substrate. Using fish as a host species allows the rayed bean to move upstream and populate habitats it could not otherwise reach.

What threatens the rayed bean mussel?

Dams: Dams affect both upstream and downstream mussel populations by disrupting natural river flow patterns, scouring river bottoms, changing water temperatures, and eliminating habitat. Adapted to living in flowing water, the rayed bean

cannot survive in the still water impounded behind dams.

The rayed bean also depends on host fish as a means to move upstream. Because dams block fish passage, mussels are also prevented from moving upstream, which isolates upstream mussel populations from downstream populations, leading to small unstable populations more likely to die out.

Pollution: Adult mussels are easily harmed by toxins and degraded water quality from pollution because they are sedentary (they tend to stay in one place). Pollution may come from specific, identifiable sources such as accidental spills, factory discharges, sewage treatment plants and solid waste disposal sites or from diffuse sources like runoff from cultivated fields, pastures, cattle feedlots, poultry farms, mines, construction sites, private wastewater discharges, and roads. Contaminants may directly kill mussels, but they may also reduce water quality, affect the ability of surviving mussels to have young, or result in lower numbers or disappearance of host fish.

Sedimentation: Although sedimentation is a natural process, poor land use practices, dredging, impoundments, and other activities accelerate erosion and increase sedimentation. Sediment that blankets a river bottom can suffocate mussels. Accelerated sedimentation may also reduce feeding and respiratory ability for rayed bean mussels, leading to decreased growth, reproduction, and survival.

Nonnative Species: The invasion of the nonnative zebra mussel into the U.S. poses a serious threat. Zebra mussels proliferate in such high numbers that they use up food resources and attach to native mussel shells in such large numbers that the native mussel cannot eat or breath. Another invasive species, the round goby, is a nonnative fish species that may displace native host fish species, thus reducing the ability of the rayed bean to reprooduce.

What is being done to conserve and restore rayed bean mussels?

Listing: In February 2012, the U.S. Fish and Wildlife Service added the rayed bean to the list of endangered species, giving the species full protection under the Endangered Species Act (ESA). The ESA provides protection against practices that kill or harm the species and requires planning for recovery and conservation actions.

Watershed Protection Partnerships: The rayed bean cannot survive without help from watershed partnerships to restore habitat and improve surface lands. Causes of habitat degradation are numerous in streams throughout its range. Often, threats are not from actions in or adjacent to rivers, but from widespread problems on uplands at the highest elevations of watersheds. Habitat restoration will require improvements across the entire watershed. The voluntary assistance of federal and state agencies, conservation groups, local governments, private landowners, industries, businesses, and farming communities will be necessary to meet recovery goals.

Reintroductions: The rayed bean was extirpated from Tennessee and West Virginia, but reintroductions into suitable habitat have reestablished the species in these states. Reintroductions were in rivers where water quality and habitat have improved since the rayed bean was extirpated.

What can you do?

Learn more about how the destruction of habitat leads to loss of endangered and threatened species and our nation's plant and animal diversity. Discuss with others what you have learned.

Help improve water quality locally in streams by minimizing use of lawn-care chemicals and properly disposing of or recycling hazardous materials found in your home, like batteries, paint, car oil, and pesticides.

When boating, please follow any rules established to prevent the spread of exotic pests like the zebra mussel.

Join a conservation group or volunteer at a local nature center, zoo, or wildlife refuge.

U.S. Fish & Wildlife Service
5600 American Blvd., Suite 990
Bloomington, Minnesota 55437-1458
612/713-5350
http://www.fws.gov/midwest/endangered

January 2012

U.S. Fish & Wildlife Service

Threatened and Endangered Species

This mussel survives in less than 5 percent of its former range.

Northern Riffleshell

(*Epioblasma torulosa rangiana*)

The Northern Riffleshell is a federally *endangered species*. Endangered species are animals and plants that are in danger of becoming extinct. *Threatened species* are plants and animals that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's Endangered Species Program.

Habitat

This mussel is found in a wide variety of streams from large to small. It buries itself in bottoms of firmly packed sand or gravel with its feeding siphons exposed.

Behavior

Reproduction requires a stable, undisturbed habitat and a sufficient population of host fish to complete the mussel's larval development. When the male discharges sperm into the current, females downstream siphon in the sperm in order to fertilize their eggs, which they store in their gill pouches until the larvae hatch. The females then expel the larvae. Those larvae that manage to find a fish host to clamp onto by means of tiny clasping valves, grow into juveniles with shells of their own. At that point they detach from the host fish and settle into the streambed, ready for a long (possibly up to 50 years) life as an adult mussel.

Why It's Endangered

Dams and reservoirs have flooded most of this mussel's habitat, reducing its gravel and sand habitat and probably affecting the distribution of its fish hosts. Reservoirs act as barriers that isolate upstream populations from downstream ones.

Erosion caused by strip mining, logging and farming adds silt to many rivers, which can clog the mussel's feeding siphons and even smother it. Other threats include pollution from agricultural and industrial runoff. These chemicals and toxic metals become concentrated in the body tissues of such filter-feeding mussels as the northern riffleshell, eventually poisoning it to death.

Zebra mussels, an exotic (non-native) species which is spreading rapidly throughout the eastern U.S., also pose a threat. By attaching in great numbers to native mussels such as the northern riffleshell, zebra mussels suffocate and kill the native species.

U.S. Fish & Wildlife Service
Endangered Species Division
1 Federal Drive
Fort Snelling, Minnesota 55111-4056
612/713-5350
Federal Relay Service 1-800-877-8339
http://midwest.fws.gov/endangered
1997

UNIVERSITY OF MICHIGAN

Lynn Vaccaro <lvaccaro@umich.edu>

Reef Restoration Project and State Listed Species Review

5 messages

Lynn Vaccaro <lvaccaro@umich.edu> Wed, May 7, 2014 at 9:28 PM
To: SargentL@michigan.gov
Cc: Paul Evanoff <paul.evanoff@smithgroupjjr.com>, "Read, Jennifer" <jenread@umich.edu>

Hi Lori,

I left you a voice message last week and decided an email summary might be easiest. I'm working with a mulit-agency team of scientists that is restoring fish spawning habitat by creating spawning reefs in the St. Clair and Detroit Rivers. The reefs are essentially beds of loose quarried rock, 2 feet thick, that are placed via crane and barge on the river bottomlands at least 200 feet from shore, in water at least 25 feet deep.

The team has completed three pilot spawning reef projects over the past 10 years and now has funds for several upcoming projects from the USEPA (Great Lakes Restoration Initiative) through the USGS Great Lakes Science Center. To help USGS ensure NEPA compliance we have prepared an Environmental Assessment (draft report attached, appendices are at this link). The EA discusses potential reef projects in five locations, two in the St. Clair River which are fairly well planned, and three in the Detroit River which are in preliminary assessment and planning stage.

What we're looking for:
The EPA Region 5 NEPA office has requested that we initiate communication with MDNR to determine if additional consultation is needed to determine if any state-listed endangered or threatened species are present within the project boundaries, and if project implementation would or could detrimentally affect any listed species or their critical habitat.

What we've done already:
Our team conducts extensive physical and biological assessment at each proposed reef location in advance of project permitting and spawning reef construction. Pre and post assessment includes an evaluation of fish egg deposition (with egg mats), adult fish use of the area (via gill nets, set lines and minnow traps), and larval fish production and drift (with bongo samplers and D frame drift nets), as well as underwater video, sonar and scuba dive surveys to characterize the river bottom and properly design the reef.

This assessment process has given us a good understanding of the existing habitat and aquatic species present at a proposed location. We only locate projects in areas with relatively smooth hard-pan clay sediments. If we find any structures (e.g., tree trunks, old docks, rock outcrops) that seem to be used by fish, we avoid placing rock in that area. Although there may be encrusted Dreissenid mussels at a reef site, there are generally few other resident aquatic species.

Completed projects demonstrate that the constructed spawning reefs are used by a number of fish species with similar spawning habitat requirements, including lake sturgeon, lake whitefish, walleye, suckers and catfish. We believe at least two state listed species will benefit from the reefs: lake sturgeon and northern madtom, and others such as Cisco may in the future as their numbers in the river system increase.

We have reviewed the MNFI database and feel confident that no state listed species will be negatively impacted by the proposed spawning reefs. We have not observed any native mussels or mussel shells in the areas proposed for spawning habitat restoration. Any potential impact for fish is likely to be positive or neutral. And because the reefs are located in waters at least 25 feet deep and all construction happens via barges, there are no expected impacts for birds or aquatic plants. The attached draft EA report discusses lake sturgeon, northern madtom and the northern riffleshell in some detail with the conclusion that lake sturgeon and northern madtom

are likley to benefit and the northern riffleshell is likely to experience no effect from the proposed restoration.

Lorri, do we need to do a formal consultation with MDNR about potential impacts to state listed species? If so, what, if any, additional information do you need from us and what process do you recommend?

We appreciate any guidance you can offer.

Sincerely,
Lynn Vaccaro
Project coordinator of the "reef restoration team"

Additional info is available here:
http://www.miseagrant.umich.edu/explore/restoration/restoring-fish-habitat-st-clair-river/

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty St., Suite 310
(734) 763-1530

SCDRS Fish Spawning EA 2014.pdf
1888K

Sargent, Lori (DNR) <SargentL@michigan.gov> Thu, May 8, 2014 at 11:15 AM
To: Lynn Vaccaro <lvaccaro@umich.edu>
Cc: Paul Evanoff <paul.evanoff@smithgroupjjr.com>, "Read, Jennifer" <jenread@umich.edu>

The Michigan Department of Natural Resources (DNR) is, unfortunately, no longer able to conduct Environmental Reviews (ER) and ceased acceptance of review requests September 16, 2011. Funding for the program was not included in the state budget for the fiscal year that begins October 1 and issuance of clearance letters will no longer be done. Project review requests can be sent to Michigan Natural Features Inventory (MNFI), a program of Michigan State University Extension.

If the proposed project will not impact state-protected species, you do not need to consult with us.

If you have any questions, please e-mail me at SargentL@michigan.gov. Thank you.

Lori Sargent

DNR Wildlife Division

PO Box 30444

Lansing, MI 48909

517-284-6216

SargentL@michigan.gov

Do you love eagles, ospreys and loons? Support management and education activities for endangered and threatened wildlife - buy a DNR Living Resources Patch or a Wildlife Habitat License Plate today!

From: Lynn Vaccaro [mailto:lvaccaro@umich.edu]
Sent: Wednesday, May 07, 2014 9:28 PM
To: Sargent, Lori (DNR)
Cc: Paul Evanoff; Read, Jennifer
Subject: Reef Restoration Project and State Listed Species Review

[Quoted text hidden]

Lynn Vaccaro <lvaccaro@umich.edu> Fri, May 9, 2014 at 3:37 PM
To: "Sargent, Lori (DNR)" <SargentL@michigan.gov>
Cc: Paul Evanoff <paul.evanoff@smithgroupjjr.com>, "Read, Jennifer" <jenread@umich.edu>

Hi Lori,

Thank you for the response and I'm sorry to hear the Environmental Review program has been cancelled. Is there someone you'd recommend we contact at MNFI?

Thanks,
Lynn

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty St., Suite 310
(734) 763-1530

[Quoted text hidden]

Sargent, Lori (DNR) <SargentL@michigan.gov> Mon, May 12, 2014 at 12:17 PM
To: Lynn Vaccaro <lvaccaro@umich.edu>
Cc: Paul Evanoff <paul.evanoff@smithgroupjjr.com>, "Read, Jennifer" <jenread@umich.edu>

Mike Sanders handles their reviews.

Lori Sargent

DNR Wildlife Division

PO Box 30444

Lansing, MI 48909

517-284-6216

SargentL@michigan.gov

Do you love eagles, ospreys and loons? Support management and education activities for endangered and threatened wildlife - buy a DNR Living Resources Patch or a Wildlife Habitat License Plate today!

From: Lynn Vaccaro [mailto:lvaccaro@umich.edu]
Sent: Friday, May 09, 2014 3:37 PM
To: Sargent, Lori (DNR)
Cc: Paul Evanoff; Read, Jennifer
Subject: Re: Reef Restoration Project and State Listed Species Review

[Quoted text hidden]

Lynn Vaccaro <lvaccaro@umich.edu> Mon, May 12, 2014 at 12:27 PM
To: "Sargent, Lori (DNR)" <SargentL@michigan.gov>

Thanks, Lori.

Lynn

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty St., Suite 310
(734) 763-1530

[Quoted text hidden]

MICHIGAN STATE UNIVERSITY | Extension

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty Street, Suite 310
Ann Arbor, MI 48104

June 4, 2014

Re: Rare Species Review #1425 (Harts Light Reef St. Clair River) – Remediation of Native Fish Spawning Habitat in the Detroit – St. Clair River System, Michigan.

Hello:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, …fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.

Although several legally protected species have been documented near the proposed remediation site, it is **not likely** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without visiting the project site.** MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders
Rare Species Review Specialist
Michigan Natural Features Inventory

MSU EXTENSION

Michigan Natural Features Inventory

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

Comments for Rare Species Review #1425: Although several legally protected species have been documented near the proposed remediation site, it seems the necessary measures have been taken to avoid impacting rare native mussels and fish species. In fact, rare fish species may benefit from these artificial reefs. Therefore, it is **not likely** that negative impacts will occur. It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-284-6216, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Barb Hosler, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-6326, or Barbara_Hosler@fws.gov.

Table 1: Legally protected species within 1.5 miles of RSR #1425

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Noturus stigmosus	Northern madtom	1990	1990		E	G3	S1	Animal
Asclepias sullivantii	Sullivant's milkweed	2005-07-20	2005-07-20		T	G5	S2	Plant
Falco peregrinus	Peregrine falcon	2003	2012		E	G4	S1	Animal
Gentiana flavida	White gentian		1900-PRE		E	G4	S1	Plant

Please consult MNFI's Rare Species Explorer for additional information regarding the listed species: http://mnfi.anr.msu.edu/explorer/search.cfm.

Codes to accompany Table 1:

State Protection Status Code Definitions (SPROT)
E: Endangered
T: Threatened
SC: Special concern
Global Heritage Status Rank Definitions (GRANK)
The priority assigned by NatureServe's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)
The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.
S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).
S4 = apparently secure in state, with many occurrences.
S5 = demonstrably secure in state and essentially ineradicable under present conditions.
SX = apparently extirpated from state.

MICHIGAN STATE UNIVERSITY | Extension

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty Street, Suite 310
Ann Arbor, MI 48104

June 4, 2014

Re: Rare Species Review #1426 (Point Aux Chene Reef St. Clair River) – Remediation of Native Fish Spawning Habitat in the Detroit – St. Clair River System, Michigan.

Hello:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, …fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.

Although several legally protected species have been documented near the proposed remediation site, it is **not likely** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without visiting the project site.** MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders
Rare Species Review Specialist
Michigan Natural Features Inventory

MSU EXTENSION

Michigan Natural Features Inventory

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

Comments for Rare Species Review #1426: Although several legally protected species have been documented near the proposed remediation site, it seems the necessary measures have been taken to avoid impacting rare native mussels and fish species. In fact, rare fish species may benefit from these artificial reefs. Therefore, it is **not likely** that negative impacts will occur. It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-284-6216, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Barb Hosler, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-6326, or Barbara_Hosler@fws.gov.

Special concern species and natural communities are not protected under endangered species legislation but efforts should be taken to minimize any or all impacts. Species classified as special concern are species whose numbers are getting smaller in the state. If these species continue to decline they would be recommended for reclassification to threatened or endangered status.

Please consult MNFI's Rare Species Explorer for additional information regarding the listed species: http://mnfi.anr.msu.edu/explorer/search.cfm.

Table 1: Legally protected species within 1.5 miles of RSR #1426

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Platanthera ciliaris	Orange- or yellow-fringed orchid	1903	1903		E	G5	S1S2	Plant
Ranunculus ambigens	Spearwort	1904-08-07	1904-08-07		T	G4	SH	Plant
Aristida longespica	Three-awned grass	1900	1900-09-15		T	G5	S2	Plant
Epioblasma triquetra	Snuffbox	1965	1965-08-14	E	E	G3	S1	Animal
Ranunculus rhomboideus	Prairie buttercup	1900	1900		T	G5	S2	Plant
Scleria pauciflora	Few-flowered nut rush	1903-08-03	1903-08-31		E	G5	S1	Plant
Acipenser fulvescens	Lake sturgeon	1953	1984-11		T	G3G4	S2	Animal
Pantherophis gloydi	Eastern fox snake	1901	2002-08-09		T	G3	S2	Animal
Ligumia nasuta	Eastern pondmussel	1940-pre	1940-pre		E	G4	SNR	Animal
Clemmys guttata	Spotted turtle	1962-06-15	2007-05-31		T	G5	S2	Animal

Table 2: Special Concern Species and natural communities within 1.5 miles of RSR#1426

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Polygala cruciata	Cross-leaved milkwort	1914-06-14	1914-06-26		SC	G5	S3	Plant
Polygala incarnata	Pink milkwort	1900	1900		X	G5	SX	Plant
Baptisia lactea	White or prairie false indigo	1912-04-24	1912-04-24		SC	G4Q	S3	Plant
Carex festucacea	Fescue sedge	1920	1920-06-20		SC	G5	S1	Plant
Polygala incarnata	Pink milkwort	1896-07-13	1896-07-13		X	G5	SX	Plant
Fimbristylis puberula	Chestnut sedge	1904-07-10	1904-07-10		X	G5	SX	Plant
Cirsium hillii	Hill's thistle	1904	1904-07-10		SC	G3	S3	Plant
Triplasis purpurea	Sand grass	1954-08-24	1954-08-24		SC	G4G5	S2	Plant
Scleria triglomerata	Tall nut rush	1904	1966-06-16		SC	G5	S3	Plant
Cincinnatia cincinnatiensis	Campeloma spire snail				SC	G5	SNR	Animal

Codes to accompany Tables 1 & 2:

State Protection Status Code Definitions (SPROT)
E: Endangered
T: Threatened
SC: Special concern

Global Heritage Status Rank Definitions (GRANK)
The priority assigned by NatureServe's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
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State Heritage Status Rank Definitions (SRANK)
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S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.
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S4 = apparently secure in state, with many occurrences.
S5 = demonstrably secure in state and essentially ineradicable under present conditions.
SX = apparently extirpated from state.

MICHIGAN STATE UNIVERSITY | Extension

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty Street, Suite 310
Ann Arbor, MI 48104

June 4, 2014

Re: Rare Species Review #1427 (East Belle Isle Reef, Detroit River) – Remediation of Native Fish Spawning Habitat in the Detroit – St. Clair River System, Michigan.

Hello:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

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Although several legally protected species have been documented near the proposed remediation site, it is **not likely** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without visiting the project site.** MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders
Rare Species Review Specialist
Michigan Natural Features Inventory

MSU EXTENSION

Michigan Natural Features Inventory

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

Comments for Rare Species Review #1427: Although several legally protected species have been documented near the proposed remediation site, it seems the necessary measures have been taken to avoid impacting rare native mussels and fish species. In fact, rare fish species may benefit from these artificial reefs. Therefore, it is **not likely** that negative impacts will occur. It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-284-6216, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Barb Hosler, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-6326, or Barbara_Hosler@fws.gov.

Table 1: Legally protected species within 1.5 miles of RSR #1427

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Epioblasma torulosa rangiana	Northern riffleshell	1983	1983-08	LE	E	G2T2	S1	Animal
Cyclonaias tuberculata	Purple wartyback	1983	1983-08		T	G5	S2S3	Animal
Sterna forsteri	Forster's tern	1985	1985		T	G5	S2	Animal
Sterna hirundo	Common tern	1985	1985		T	G5	S2	Animal
Moxostoma carinatum	River redhorse	1984	1984-09		T	G4	S1	Animal
Percina copelandi	Channel darter	1935-07-16	1935-07-16		E	G4	S1S2	Animal
Lampsilis fasciola	Wavyrayed lampmussel	1983	1983-08		T	G5	S2	Animal
Asclepias sullivantii	Sullivant's milkweed	1998-12-09	1999-Fall		T	G5	S2	Plant
Epioblasma obliquata perobliqua	White catspaw		1930	LE	E	G1T1	SH	Animal
Zizania aquatica var. aquatica	Wild rice	1892-08-12	1892-08-12		T	G5T5	S2S3	Plant
Simpsonaias ambigua	Salamander mussel	1930-pre	1998-09-23		E	G3	S1	Animal
Obovaria olivaria	Hickorynut	1983-07-23	1998-09-23		E	G4	S2S3	Animal
Falco peregrinus	Peregrine falcon	1993	2012		E	G4	S1	Animal
Acipenser fulvescens	Lake sturgeon	2006-05-15	2006-06-01		T	G3G4	S2	Animal
Ligumia nasuta	Eastern pondmussel	1940-pre	1940-pre		E	G4	SNR	Animal
Ligumia nasuta	Eastern pondmussel				E	G4	SNR	Animal
Villosa fabalis	Rayed bean	1920	1998-09-23	E	E	G2	S1	Animal
Obovaria olivaria	Hickorynut	1936-pre	1936-pre		E	G4	S2S3	Animal
Obliquaria reflexa	Threehorn wartyback	1936-pre	1936-pre		E	G5	SNR	Animal
Epioblasma triquetra	Snuffbox	1920	2000-10-21	E	E	G3	S1	Animal
Obovaria subrotunda	Round hickorynut	1920	2000-10-21		E	G4	S1	Animal
Cyclonaias tuberculata	Purple wartyback	1930-pre	1998-09-23		T	G5	S2S3	Animal
Alasmidonta viridis	Slippershell				T	G4G5	S2S3	Animal
Sander canadensis	Sauger	1984	1984		T	G5	S1	Animal
Noturus stigmosus	Northern madtom	1937-03-21	1937-03-21		E	G3	S1	Animal
Obovaria subrotunda	Round hickorynut		1930		E	G4	S1	Animal
Epioblasma torulosa rangiana	Northern riffleshell			LE	E	G2T2	S1	Animal
Truncilla donaciformis	Fawnsfoot	2008	2008		T	G5	SNR	Animal
Epioblasma torulosa rangiana	Northern riffleshell	1920	2007	LE	E	G2T2	S1	Animal
Ligumia nasuta	Eastern pondmussel	2007	2007		E	G4	SNR	Animal
Cyclonaias tuberculata	Purple wartyback	1983	1983-08		T	G5	S2S3	Animal
Euphorbia commutata	Tinted spurge	1889-08	1889-08		T	G5	S1	Plant
Aristolochia serpentaria	Virginia snakeroot	1900	1900-07-26		T	G4	S2	Plant
Lactuca floridana	Woodland lettuce	1899	1899-08-03		T	G5	S2	Plant
Fraxinus profunda	Pumpkin ash	1998-12-09	2001-01-09		T	G4	S2	Plant

Table 2: Special Concern Species and Natural Communities within 1.5 miles of RSR#1427

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Scleria triglomerata	Tall nut rush	1860-06-21	1860-06-21		SC	G5	S3	Plant
Mimulus alatus	Winged monkey flower	1916	1916-08-27		X	G5	SX	Plant
Pleurobema sintoxia	Round pigtoe	2000-10-21	2000-10-21		SC	G4G5	S2S3	Animal
Cerastium velutinum	Field Chickweed	1867-05	1867-05		X	G5T4?	SX	Plant
Truncilla truncata	Deertoe				SC	G5	SNR	Animal
Macrhybopsis storeriana	Silver chub	1984	1984-11		SC	G5	S2S3	Animal
Ptychobranchus fasciolaris	Kidney shell	1936-pre	1936-pre		SC	G4G5	SNR	Animal
Pleurobema sintoxia	Round pigtoe	2007	2007		SC	G4G5	S2S3	Animal
Ptychobranchus fasciolaris	Kidney shell	2008	2008		SC	G4G5	SNR	Animal
Truncilla truncata	Deertoe	2008	2008		SC	G5	SNR	Animal
Pisidium simplex	A fingernail clam	1998	1998		SC	G5	SNR	Animal
Ptychobranchus fasciolaris	Kidney shell	2007	2007		SC	G4G5	SNR	Animal
Villosa iris	Rainbow	2007	2007		SC	G5Q	S2S3	Animal
Villosa iris	Rainbow	1940	2000-10-21		SC	G5Q	S2S3	Animal
Pisidium amnicum	Greater European pea clam				SC	G5	SNA	Animal
Mesodon pennsylvanicus	Proud globelet				SC	G4	SNR	Animal
Quercus shumardii	Shumard's oak	1998-12-09	1998-12-09		SC	G5	S2	Plant
Sisyrinchium hastile	Blue-eyed-grass	1896	1896-06-02		X	GUGHQ	SX	Plant
Strophostyles helvula	Trailing wild Bean	1895	1899-08-22		SC	G5	S3	Plant
Phaseolus polystachios	Wild bean	1896-08-04	1896-08-04		X	G5	SX	Plant
Smilax herbacea	Smooth carrion-flower	1896-06-05	1896-06-15		SC	G5	S3	Plant
Cerastium velutinum	Field Chickweed	1893-06	1903-05-11		X	G5T4?	SX	Plant
Wet-mesic Flatwoods		2012-11-09	2012-11-09			G2G3	S2	Community

Special concern species and natural communities are not protected under endangered species legislation but efforts should be taken to minimize any or all impacts. Species classified as special concern are species whose numbers are getting smaller in the state. If these species continue to decline they would be recommended for reclassification to threatened or endangered status.

Please consult MNFI's Rare Species Explorer for additional information regarding the listed species: http://mnfi.anr.msu.edu/explorer/search.cfm.

Codes to accompany Tables 1 & 2:

State Protection Status Code Definitions (SPROT)
E: Endangered
T: Threatened
SC: Special concern

Global Heritage Status Rank Definitions (GRANK)
The priority assigned by NatureServe's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
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G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)
The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
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S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).
S4 = apparently secure in state, with many occurrences.
S5 = demonstrably secure in state and essentially ineradicable under present conditions.
SX = apparently extirpated from state.

MICHIGAN STATE UNIVERSITY | Extension

Lynn Vaccaro
Coastal Research Specialist
Michigan Sea Grant
University of Michigan
520 E. Liberty Street, Suite 310
Ann Arbor, MI 48104

June 4, 2014

Re: Rare Species Review #1428 (Fort Wayne Reef, Detroit River) – Remediation of Native Fish Spawning Habitat in the Detroit – St. Clair River System, Michigan.

Hello:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, …fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.

Although several legally protected species have been documented near the proposed remediation site, it is **not likely** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without visiting the project site.** MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders
Rare Species Review Specialist
Michigan Natural Features Inventory

MSU EXTENSION

Michigan Natural Features Inventory

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Comments for Rare Species Review #1428: Although several legally protected species have been documented near the proposed remediation site, it seems the necessary measures have been taken to avoid impacting rare native mussels and fish species. In fact, rare fish species may benefit from these artificial reefs. It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-284-6216, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Barb Hosler, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-6326, or Barbara_Hosler@fws.gov.

Table 1: Legally protected species within 1.5 miles of RSR #1428

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Zizania aquatica var. aquatica	Wild rice	1915-09-15	1915-09-05		T	G5T5	S2S3	Plant
Pantherophis gloydi	Eastern fox snake	1959	1959-05-20		T	G3	S2	Animal
Cyclonaias tuberculata	Purple wartyback	2006-08	2006-08		T	G5	S2S3	Animal
Epioblasma torulosa rangiana	Northern riffleshell	2006-08	2006-08	LE	E	G2T2	S1	Animal
Obovaria olivaria	Hickorynut	2006-08	2006-08		E	G4	S2S3	Animal
Epioblasma torulosa rangiana	Northern riffleshell	1983-08	2005-08-09	LE	E	G2T2	S1	Animal
Toxolasma parvus	Lilliput	1936-pre	1936-pre		E	G5	SNR	Animal

Table 2: Special Concern Species and Natural Communities within 1.5 miles of RSR#1428

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Scleria triglomerata	Tall nut rush	1860-06-21	1860-06-21		SC	G5	S3	Plant
Pleurobema sintoxia	Round pigtoe	2006-08	2006-08		SC	G4G5	S2S3	Animal
Cerastium velutinum	Field Chickweed	1867-05	1867-05		X	G5T4?	SX	Plant
Villosa iris	Rainbow	2006-08	2006-08		SC	G5Q	S2S3	Animal
Villosa iris	Rainbow	1940	2000-10-21		SC	G5Q	S2S3	Animal

Special concern species and natural communities are not protected under endangered species legislation but efforts should be taken to minimize any or all impacts. Species classified as special concern are species whose numbers are getting smaller in the state. If these species continue to decline they would be recommended for reclassification to threatened or endangered status.

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G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
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MICHIGAN STATE UNIVERSITY | Extension

Lynn Vaccaro
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520 E. Liberty Street, Suite 310
Ann Arbor, MI 48104

June 4, 2014

Re: Rare Species Review #1429 (Northeast Grassy Island Reef, Detroit River) – Remediation of Native Fish Spawning Habitat in the Detroit – St. Clair River System, Michigan.

Hello:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

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Although several legally protected species have been documented near the proposed remediation site, it is **not likely** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without visiting the project site.** MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

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Michigan Natural Features Inventory

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Comments for Rare Species Review #1429: Although several legally protected species have been documented near the proposed remediation site, it seems the necessary measures have been taken to avoid impacting rare native mussels and fish species. In fact, rare fish species may benefit from these artificial reefs. It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-284-6216, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Barb Hosler, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-6326, or Barbara_Hosler@fws.gov.

Table 1: Legally protected species within 1.5 miles of RSR #1429

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Acipenser fulvescens	Lake sturgeon	1978	1978		T	G3G4	S2	Animal
Sterna hirundo	Common tern	1977	1985		T	G5	S2	Animal
Sterna hirundo	Common tern	1960	1962		T	G5	S2	Animal
Clemmys guttata	Spotted turtle	1997	1997-06-04		T	G5	S2	Animal
Zizania aquatica var. aquatica	Wild rice	1915-09-15	1915-09-05		T	G5T5	S2S3	Plant
Acipenser fulvescens	Lake sturgeon	1978	1978		T	G3G4	S2	Animal
Epioblasma torulosa rangiana	Northern riffleshell	1930s	1930s	LE	E	G2T2	S1	Animal
Ligumia nasuta	Eastern pondmussel	1940-pre	1940-pre		E	G4	SNR	Animal
Obovaria olivaria	Hickorynut	1936-pre	1936-pre		E	G4	S2S3	Animal
Obovaria subrotunda	Round hickorynut				E	G4	S1	Animal
Cyclonaias tuberculata	Purple wartyback				T	G5	S2S3	Animal
Ligumia recta	Black sandshell				E	G5	SNR	Animal
Alasmidonta viridis	Slippershell				T	G4G5	S2S3	Animal

Table 2: Special Concern Species and Natural Communities within 1.5 miles of RSR#1429

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
Macrhybopsis storeriana	Silver chub	1984	1985-03		SC	G5	S2S3	Animal
Ptychobranchus fasciolaris	Kidney shell	1933-06-13	1933-06-13		SC	G4G5	SNR	Animal
Alasmidonta marginata	Elktoe	1936-pre	1936-pre		SC	G4	S2S3	Animal
Pleurobema sintoxia	Round pigtoe				SC	G4G5	S2S3	Animal
Villosa iris	Rainbow	2006-08	2006-08		SC	G5Q	S2S3	Animal

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